SABRE 5&6 shortcuts

CANADAIR

LIMITED · MONTREAL

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Revised July 56

SABRE 5&6 shortcuts

This booklet is for informational purposes only and is not to be construed as authority or as superseding any established Description and Maintenance Manual procedure.

CANADAIR
LIMITED · MONTREAL

Issued by:

SALES SERVICE DIVISION

FACTORY NUMBER	MARK NUMBER	RCAF NUMBER
1	1	19101
2 to 99	2	19102 to 19199
100	3	19200
101 to 352	2	19201 to 19452
353 to 790	4	19453 to 19890
791 to 1160	5	23001 to 23370
1161 to 1550	6	23371 to 23760

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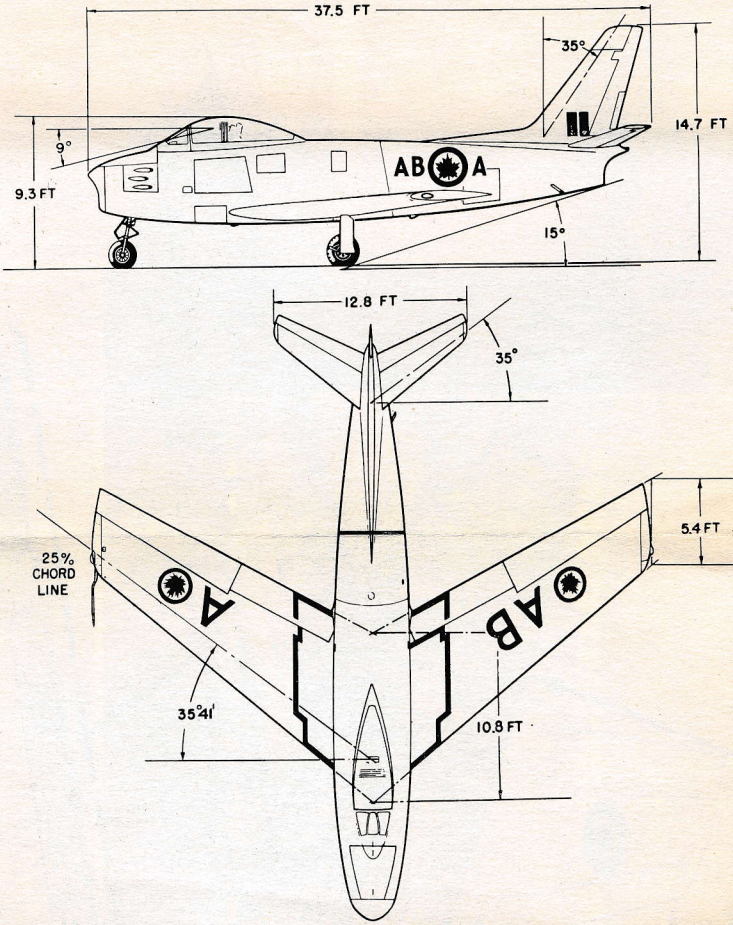
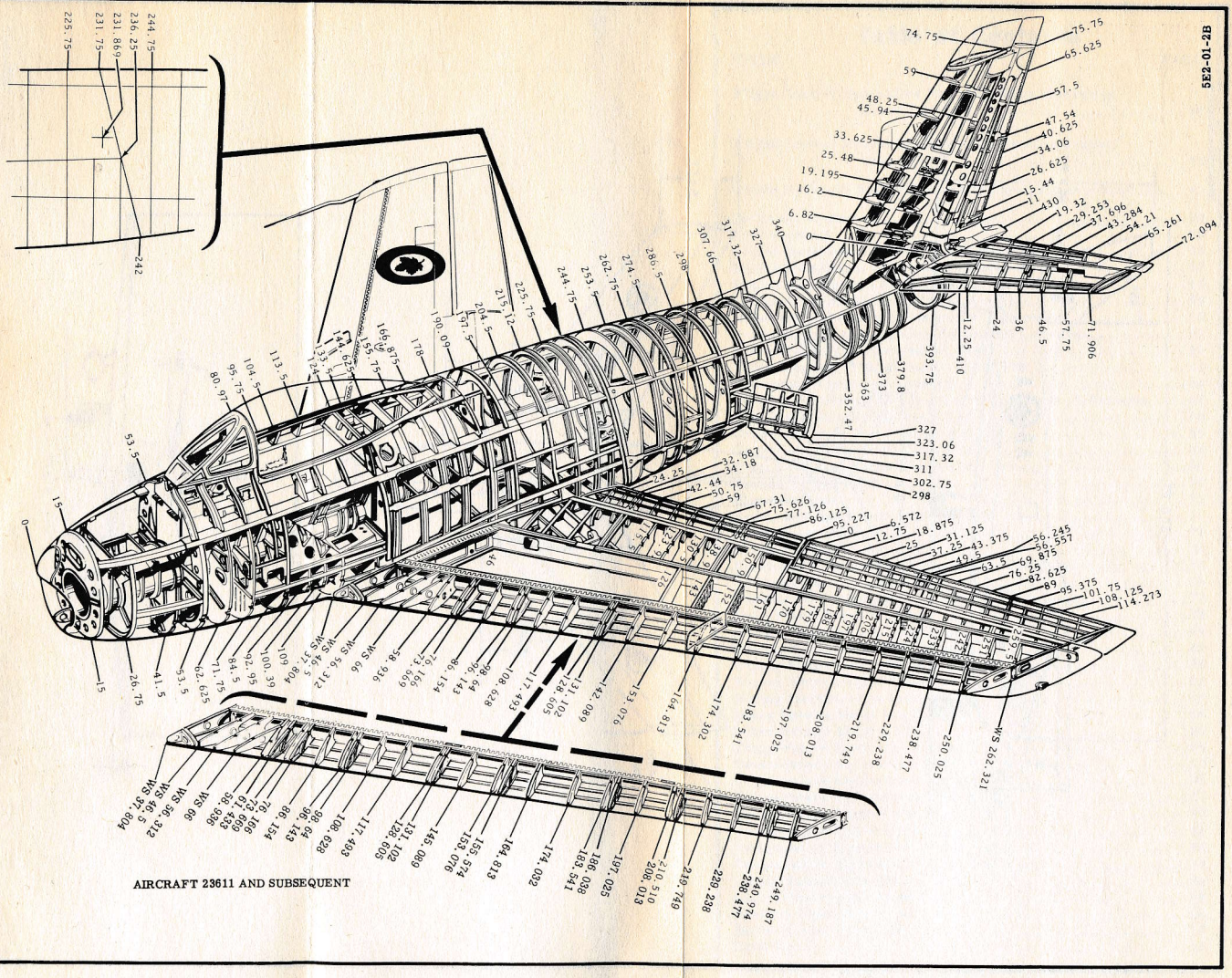

37.5 FT
35°
14.7 FT
9°
9.3 FT
AB A
15°
12.8 FT
35°
5.4 FT
25% CHORD LINE
A
AB
35°41'
10.8 FT
37.1 FT
10°
3°
8.3 FT

5E2-01-1A



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AREAS	sq. ft.
Total wing area (inc. ailerons and flaps in horizontal plane)	287.9
Total aileron area	32.8
Total wing flap area	32.5
Area of horizontal stabilizer	24.9
Area of each elevator	4.1
Area of vertical stabilizer	25.32
Total rudder area	8.12
Area of rudder trim tab	.87
Total frontal area of dive brakes	8.64

AIRFOIL DATA

Wing Root	Normal to 1/4 C NACA 0012 (11.6) -64 mod.
Wing Tip	Normal to 1/4 C NACA 0012 (10.2) -64 mod.
Wing Root	Sta. 0 Incidence + 1.0°
Wing Tip	Sta. 220.8 Incidence - 1.0°
Wing Aspect Ratio	4.557
Wing M.A.C.	101.96 in. (Wing Sta. 98.71)
Vertical M.A.C. Location	5.141 above W.R.P. at Sta. 0
Vertical Tail Aspect Ratio	1.74
Horizontal Tail Aspect Ratio	4.65
H.T. M.A.C. Plan View in Plane of Surface	34.71 (H.T. Sta. 33.54)

APPROXIMATE WEIGHTS

	LBS	
	SABRE 5	SABRE 6
Basic Weight	11170 lb. ± 1-1/2%	10840 lb. ± 1/2%
Typical service load (with JP4 fuel).	3570 lb.	3570 lb.
Typical gross weight	14740 lb.	14410 lb.
Typical load with two 1000 lb. bombs	5690 lb.	5690 lb.
Typical gross weight with Two 1000 lb. bombs	16860 lb.	16530 lb.
Typical load with sixteen 5" rockets	5730 lb.	5730 lb.
Typical gross weight with Sixteen 5" rockets	16900 lb.	16570 lb.
Typical gross weight with two empty 100 Imp. Gal. drop tanks	14940 lb.	14610 lb.
Typical gross weight with two full 100 Imp. Gal. drop tanks	16500 lb.	16170 lb.
Typical gross weight with two empty 166-1/2 Imp. Gal. drop tanks	15080 lb.	14750 lb.
Typical gross weight with two full 166-1/2 Imp. Gal. drop tanks	17680 lb.	17350 lb.

FUEL

(a)	Outer wing cells (2)	Aircraft 23001 to 23006 inclusive 56 Imp. (67.2 U.S.) Gal. each Aircraft 23007 and subsequent 57 Imp. (68.5 U.S.) Gal. each
(b)	Wing centre section cell (1)	61 Imp. (73.2 U.S.) Gal.
(c)	Front fuselage cell (1)	102 Imp. (122.4 U.S.) Gal.
(d)	Rear fuselage cell (1)	80 Imp. (96.0 U.S.) Gal.
(e)	Droppable Tanks	166.5 Imp. (200 U.S.) Gal. each
(f)	Fuel available, total using 166.5 Imp. (200 U.S.) Gal. Droppable Tanks (2)	Aircraft 23001 to 23007 inclusive 688 Imp. (826 U.S.) Gal. each Aircraft 23006 and subsequent 690 Imp. (828.6 U.S.) Gal.
(g)	Front fuselage cell expansion space.	12 Imp. (14.4 U.S.) Gal.

NOTE

With 100 Imp. (120 U.S.) droppable tanks (2) the total fuel available is 557 Imp. (669 U.S.) Gal.

OIL

(a)	Tank usable capacity	2.9 Imp. (3.5 U.S.) Gal.
(b)	Expansion space	0.8 Imp. (1.0 U.S.) Gal.

HYDRAULIC FLUID

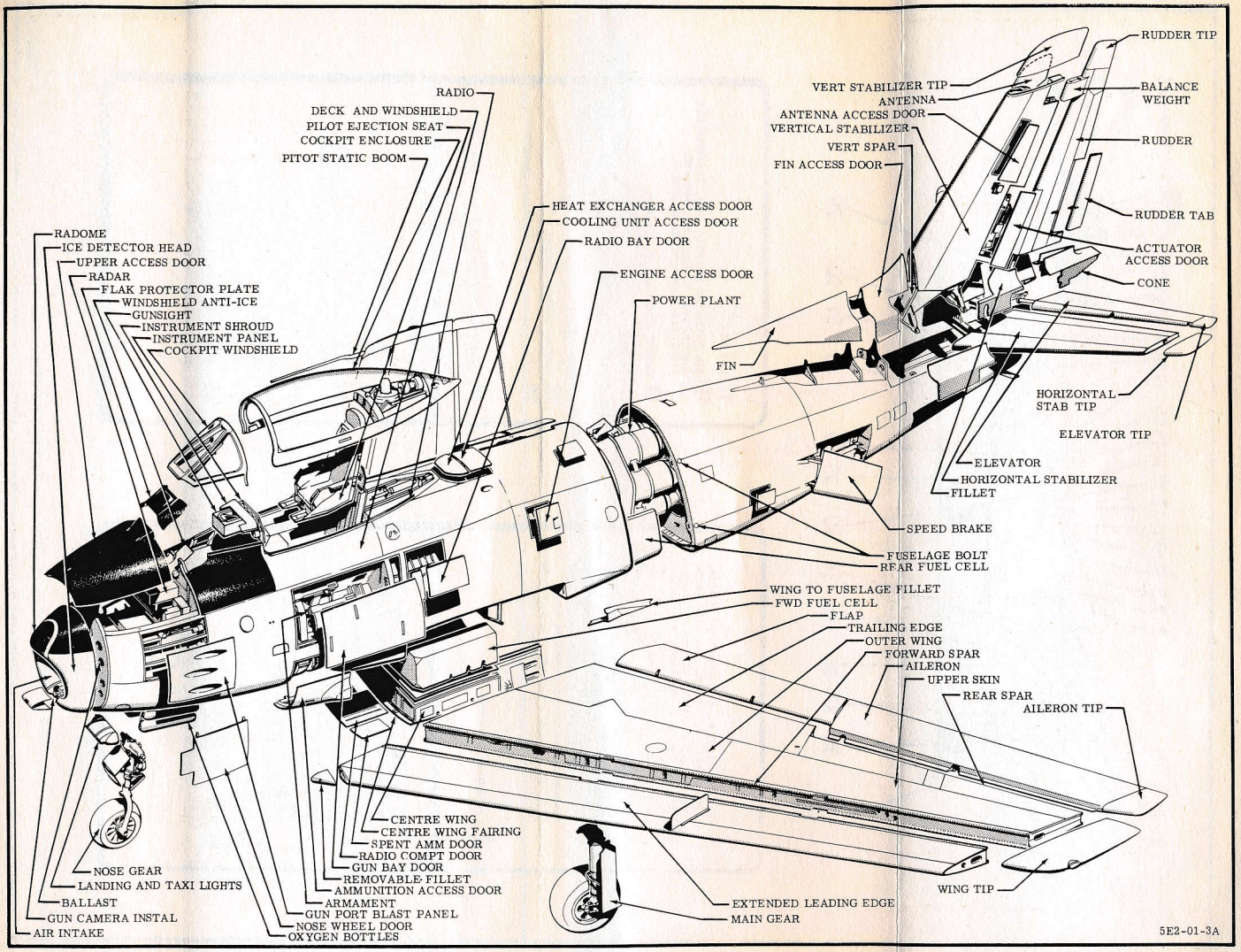
(a)	System reservoir fluid capacity	1.66 Imp. (2 U.S.) Gal.
(b)	System reservoir air space	0.23 Imp. (0.28 U.S.) Gal.

FUEL DE-ICING ALCOHOL
(Aircraft 23001 to 23210 inclusive)

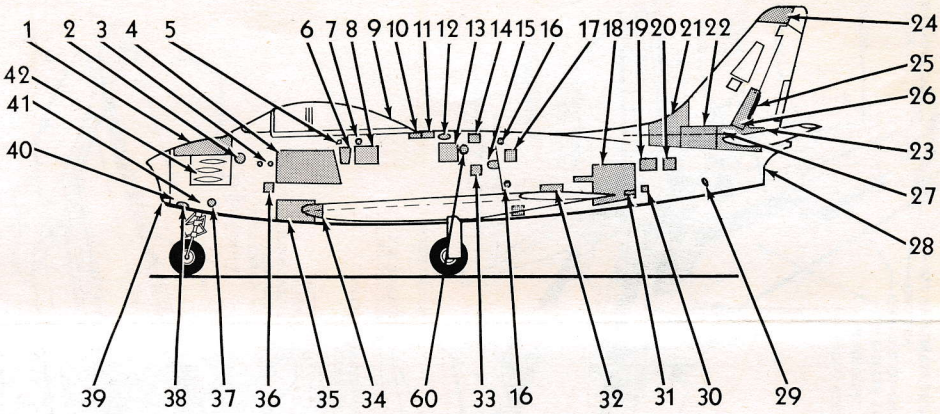
(a)	Tank capacity, fuel filter de-icing	0.83 Imp. (1.0 U.S.) Gal.

OXYGEN CYLINDERS

(a)	Four Type D-2, low pressure	450 psi max.



Exploded View of Aircraft



1 RADAR, BATTERY AND GUNSIGHT ACCESS. RADAR SCOPE ANTENNA. VOLTAGE REGULATOR, SIGHT AMPLIFIER, RELAY AND BREAKER PANELS, VOLTAGE TEST TERMINALS AND COMPUTER. ICE DETECTOR SWITCH.

2 HYDRAULIC BRAKE CYLINDER AND PARKING BRAKE ACTUATOR.

3 CANOPY OPENING AND CLOSING BUTTONS.

4 GUN BAY. CHARGING UNITS, BORESIGHT FIXTURE, DROP TANK PRESSURE REGULATOR, CABIN PRESSURE TEST AND DUMP RECEPTACLES, G SUIT PRESSURE CHECK VALVE, MECHANICAL BOMB RELEASE AND ARMING SAFETY SWITCH.

5 LIFTING LUG ACCESS.

6 STICK STOP ACCESS, FUEL LINES.

7 EMERGENCY CANOPY RELEASE.

8 RADIO BAY. VOLTAGE REGULATOR, SPEED BRAKE DUMP VALVE, THERMAL RELIEF VALVES; TRANSPONDER, RADIO COMPASS RECEIVER, THREE PHASE INVERTER, STATIC CONVERTER; WINDSHIELD DE-ICING CHECK VALVE, CANOPY ACTUATOR MOTOR; RELAY AND FUSE PANELS, A.C. POWER UNIT AND RELAYS, WING FLAP SEQUENCE SWITCHES, A.C. TRANSFORMER AND TRANSFER RELAYS; IFF DESTRUCTOR BOX, CANOPY SEAL REGULATOR AND SOLENOID VALVE, COLOUR CODE CHART.

9 CANOPY.

10 CABIN COOLING UNIT.

11 TURBINE.

12 OIL PRESSURE TRANSMITTER, TACHOMETER GENERATOR, ENGINE CONTROL AND THROTTLE WARNING HORN ACCESS.

13 ENGINE ACCESSORIES, ALCOHOL TANK. BORESIGHT FIXTURE, AND DE-ICING DIFFERENTIAL SWITCH.

14 HYDRAULIC AND CABLE QUICK DISCONNECTS, FUEL PUMP.

15 ENGINE MOUNT ACCESS.

16 REAR SECTION ATTACHING BOLTS ACCESS.

17 IGNITER PLUG ACCESS.

18 SPEED BRAKE WELL. ACTUATOR, ALTERNATE FLIGHT CONTROL SWITCHES, RESERVOIR, SIGHT GLASS AND RELIEF VALVES.

19 ALTERNATE HYDRAULIC CONTROL SYSTEM COMPENSATOR.

20 TAIL PIPE SUPPORTS.

21 EMPENNAGE CONTROLS.

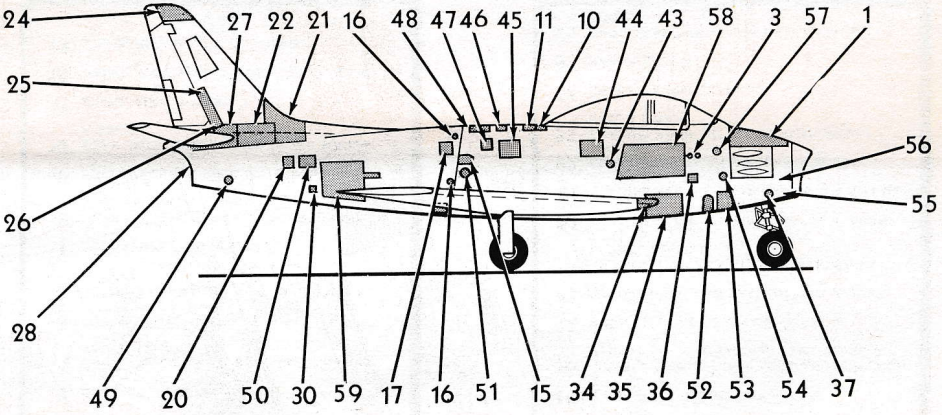
22 STABILIZER BELL-CRANK AND STOPS, LINKAGE AND RUDDER TRIM QUICK DISCONNECT.

23 STABILIZER CONTROL ACCESS.

24 ANTENNA.

25 RUDDER TRIM TAB ACTUATOR.

26 STABILIZER TRIM ACCESS.



27 STABILIZER CONTROL ACTUATOR ACCESS.

28 TAIL PIPE, DRAINS AND RESTRICTOR SEGMENTS.

29 FUEL VENT CLAPPER VALVE.

30 COMPENSATOR, HYDRAULIC FLUID LEVEL INDICATOR.

31 SPEED BRAKE DOOR LATCH LOCATION.

32 GROUND FIRE FIGHTING DOOR, DATA CASE AND EMERGENCY HYDRAULIC MOTOR AND PUMP.

33 EXTERNAL ELECTRICAL POWER CONNECTIONS.

34 LEADING EDGE FAIRING ACCESS TO AMMUNITION DOOR.

35 AMMUNITION BOXES, HEAT THERMAL SWITCHES, LOWER DOOR FOR STEP.

36 KICK STEP.

37 OXYGEN BOTTLE AND TRUNNION PIN ACCESS

38 LANDING LIGHTS.

39 CAMERA ACCESS DOOR.

40 CAMERA FILM LOADING ACCESS.

41 NOSE GEAR SHOCK STRUT, SOLENOID SHUT-OFF VALVE AND STEERING ADJUSTMENTS.

42 GUN BLAST TUBES, OXYGEN BOTTLE, PARKING VALVE, COMPENSATOR AND GUN CHARGER RELAYS.

43 FUEL FILLER CAP.

44 RADIO BAY AND HYDRAULIC RESERVOIR.

45 ELECTRICAL DISCONNECTS, HYDRAULIC TEST CONNECTIONS AND NORMAL FLIGHT RESERVOIR AND SIGHT GAUGE.

46 HYDRAULIC PUMP AND UPPER ENGINE MOUNT.

47 OIL FILLER AND DIP STICK.

48 ENGINE ACCESSORIES, CONTROLS AND HYDRAULIC QUICK DISCONNECTS.

49 ENGINE WASTE AIR VENT.

50 NORMAL HYDRAULIC CONTROL COMPENSATOR.

51 FUEL FILLER.

52 AIR BOTTLE.

53 AIR COMPRESSOR AND GAUGE, RESET HANDLE (NOSE GEAR SELECTOR VALVE).

54 OXYGEN CHARGING VALVE.

55 FUEL REGULATOR PITOT.

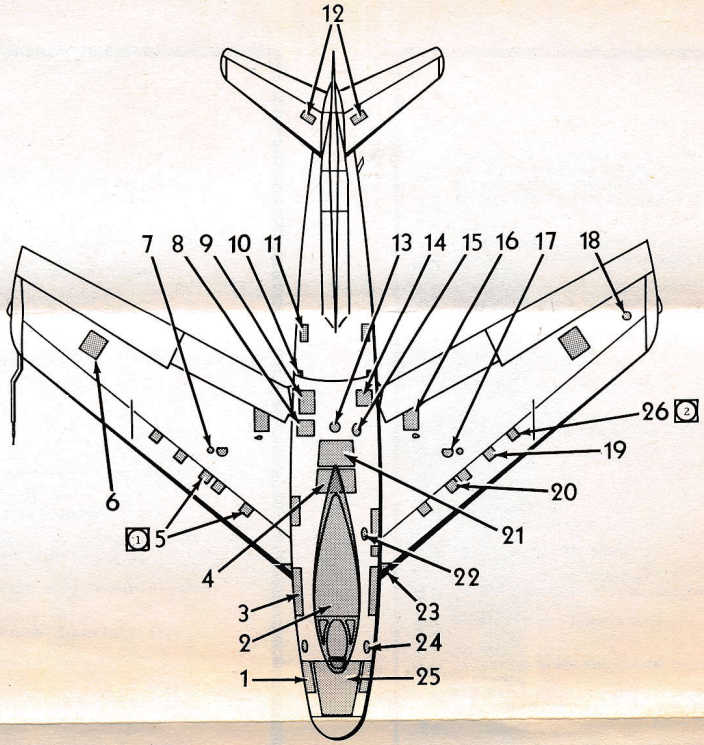
56 ICE DETECTOR HEAD.

57 BRAKE CYLINDER AND EMERGENCY RESERVOIR.

58 GUN BAY; CHARGING UNITS, BOOSTER MOTORS, RELAY PANEL AND MANUAL CHARGING.

59 SPEED BRAKE WELL. ALTERNATE HYDRAULIC ACCUMULATOR, ACTUATOR, AIR FILLERS AND PRESSURE GAUGES, RELIEF VALVE, PRESSURE SWITCHES.

60 FUEL AND OIL PRESSURE TRANSMITTERS.



1 GUN BLAST TUBES AND OXYGEN BOTTLE ACCESS, R AND L.

2 CANOPY

3 GUN BAY, R AND L.

4 CABIN COOLING UNIT AND AIR MIXING VALVE ACCESS.

5 JETTISON MECHANISM, R AND L. [1]

6 AILERON HYDRAULIC ACTUATOR ACCESS, R AND L.

7 GROUNDING PLUG ACCESS.

8 UPPER ENGINE BAY AND UPPER ENGINE MOUNT ACCESS.

9 ENGINE ACCESSORIES.

10 REAR SECTION ATTACHING BOLT ACCESS, R AND L.

11 SPARK PLUG ACCESS. R AND L.

12 PANEL SECURING SCREWS ACCESS, R AND L.

13 UPPER ENGINE MOUNT ACCESS.

14 CONTROL CABLES AND HYDRAULIC LINES QUICK DISCONNECTS. FUEL PUMP ACCESS. TARGET TOW MANUAL RELEASE DISCONNECT AND CODE FOR A/C 23001 TO 23430 INCLUSIVE.

15 UPPER ENGINE CONTROL ACCESS.

16 UNDERCARRIAGE DOWN LOCK AND TRUNNION PIN AND LOCKING BOLT ACCESS, R AND L.

17 FUEL FILLER CAP ACCESS, R AND L.

18 GYROSYN COMPASS TRANSMITTER ACCESS.

19 AILERON CABLES AND HYDRAULIC LINES UNIONS, R AND L.

20 DROP TANK CONNECTION ACCESS, R AND L.

21 TURBINE ACCESS (HEAT AND VENT SYSTEM).

22 EMERGENCY CANOPY RELEASE ACCESS.

23 LEADING EDGE ACCESS TO AMMUNITION BAY, L AND R.

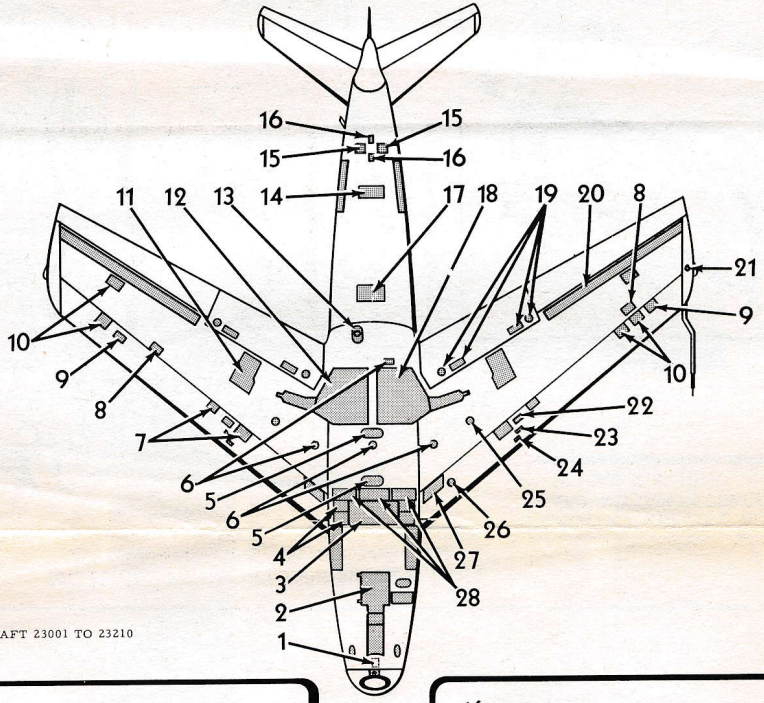
24 BRAKE CYLINDER ACCESS, L AND R.

25 RADAR ACCESS.

26 DROP TANK FUEL FLOW INDICATOR [2] ACCESS.

[1] AIRCRAFT 23001 TO 23210

[2] AIRCRAFT 23211 AND SUBSEQUENT



[1] AIRCRAFT 23001 TO 23210

1 ELECTRICAL PRESSURIZED DISCONNECT (AIR INTAKE UPPER SKIN).

2 NOSE GEAR WELL. AIRCRAFT LEVELING PADS, EMERGENCY HYDRAULIC ACCUMULATOR GAUGE AND AIR CHARGING VALVE.

3 COMMAND RADIO.

4 EXPENDED AMMUNITION ACCESS, L AND R.

5 FUEL BOOSTER PUMPS ACCESS.

6 FUEL DRAIN ACCESS.

7 MANUAL JETTISON MECHANISMS, L AND R. [1]

8 AILERON CABLES AND HYDRAULIC UNIONS, L AND R.

9 HYDRAULIC RELIEF VALVE, L AND R.

10 HYDRAULIC LINE UNIONS, L AND R.

11 FLAP ACTUATOR ACCESS, L AND R.

12 LH WHEEL WELL. HEAT AND VENT SHUT-OFF VALVE, SPEED BRAKE CONTROL VALVE, NORMAL SYSTEM ACCUMULATOR AND RESERVOIR, BOOSTER PUMP TEST SWITCHES.

13 FUEL TRANSFER PUMP AND DRAIN ACCESS.

14 TAIL PIPE CLAMP ACCESS.

15 HYDRAULIC SYSTEMS FILLER CONNECTIONS.

16 GROUND CONNECTIONS.

17 ENGINE WASTE AIR VENT CONNECTION ACCESS.

18 RH WHEEL WELL. SPEED BRAKES ACCUMULATOR, HYDRAULIC SELECTOR VALVES, HYDRAULIC AND OIL SYSTEM DRAINS, FLAP FLEXIBLE DRIVE.

19 FLAP ROLLERS SECURING BOLTS ACCESS, L AND R.

20 AILERON SEAL ACCESS, L AND R.

21 PITOT LINE UNIONS.

22 BOMB RACK ELECTRICAL DISCONNECT, L AND R.

23 DROP TANK FUEL CONNECTION, L AND R.

24 DROP TANK PRESSURE CONNECTION, L AND R.

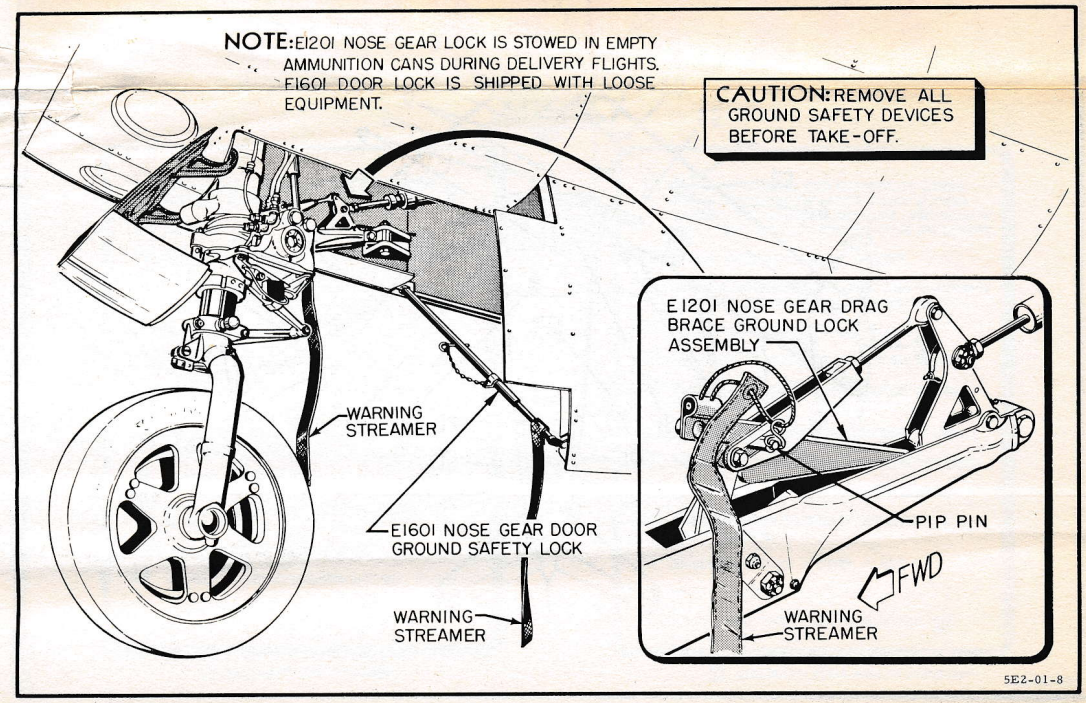
25 WING FUEL CELL TENSION-COMPRESSION POST, L AND R.

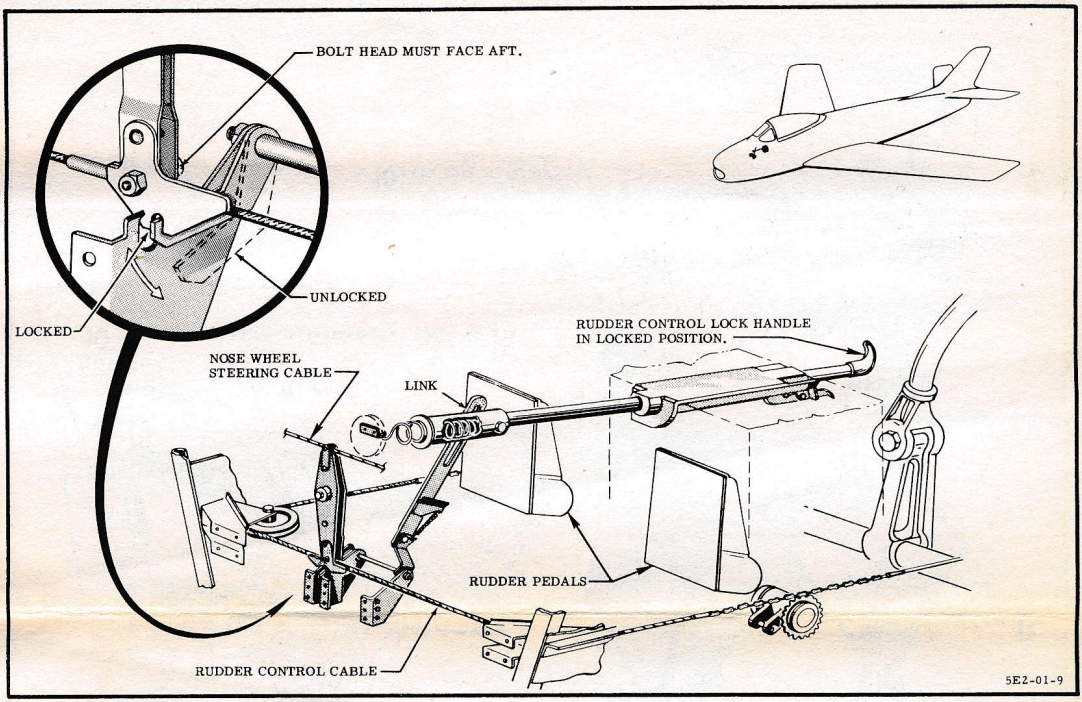
26 PITOT STATIC DRAIN ACCESS.

27 AILERON BELL-CRANK RIG PIN HOLES AND FUEL DRAIN, L AND R.

28 AILERON BUNGEE AND BELL-CRANK, HYDRAULIC PRESSURE TRANSMITTERS, AILERON TRIM ACTUATOR AND NORMAL SYSTEM SOLENOID AND RELIEF VALVE.

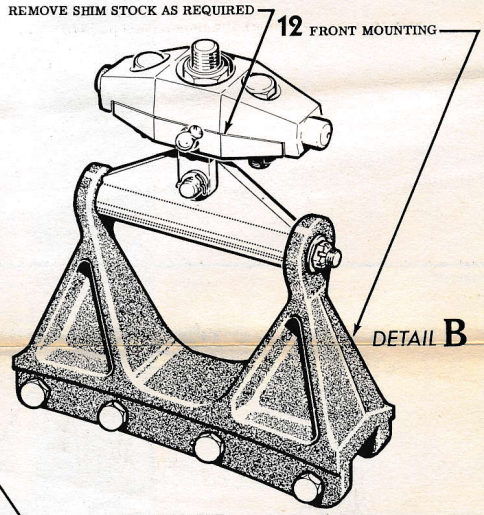
5E2-01-7

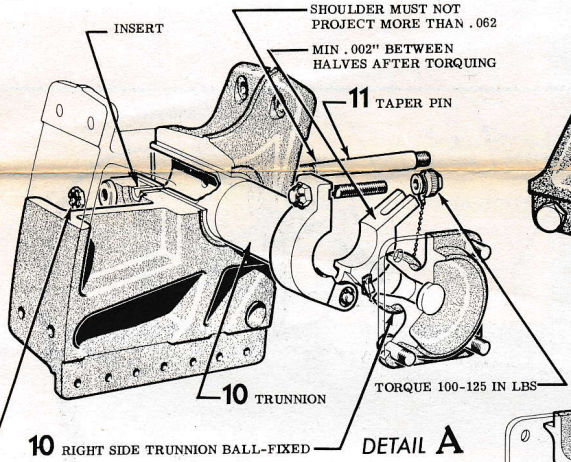

NOTE: E1201 NOSE GEAR LOCK IS STOWED IN EMPTY AMMUNITION CANS DURING DELIVERY FLIGHTS. E1601 DOOR LOCK IS SHIPPED WITH LOOSE EQUIPMENT.
CAUTION: REMOVE ALL GROUND SAFETY DEVICES BEFORE TAKE-OFF.
WARNING STREAMER
E1601 NOSE GEAR DOOR GROUND SAFETY LOCK
WARNING STREAMER
E1201 NOSE GEAR DRAG BRACE GROUND LOCK ASSEMBLY
PIP PIN
FWD
WARNING STREAMER
5E2-01-8

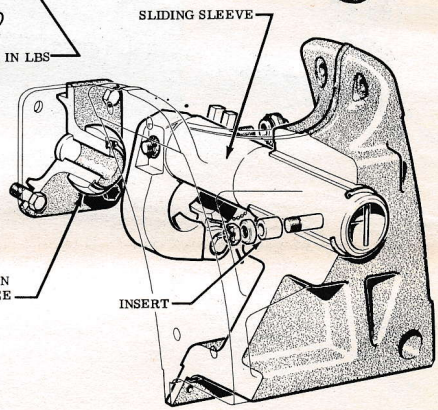

BOLT HEAD MUST FACE AFT.
UNLOCKED
LOCKED
RUDDER CONTROL LOCK HANDLE
IN LOCKED POSITION.
NOSE WHEEL
STEERING CABLE
LINK
RUDDER PEDALS
RUDDER CONTROL CABLE
5E2-01-9

TO INSTALL ENGINE, USING ENGINE GUIDE SLING, PROCEED AS FOLLOWS:

1. PLACE FORWARD FUSELAGE ON JACKS, UTILIZING E 978 FITTINGS ON STA. 125 JACKING POINTS.
2. ATTACH CARRIAGE, COMPLETE WITH PICK-UPS ASSEMBLED, TO ENGINE, USING PINS PROVIDED.
3. AFTER CARRIAGE IS SECURED TO ENGINE, INSERT BEAM INTO CARRIAGE. CHECK THAT CROSSBEAM AND HOOK ARE PROPERLY BOLTED TO THE BEAM.
4. ADJUST SLINGING EYE FORE OR AFT TO THE APPROPRIATE POSITION AS INDICATED BY THE MARKINGS ON THE CARRIAGE.
5. HOIST ENGINE TO APPROPRIATE HEIGHT AND ALIGN CROSSBEAM WITH UPPER FUSELAGE ATTACHMENT POINTS.
6. ATTACH CROSSBEAM TO FUSELAGE ATTACHMENT POINTS, USING PINS PROVIDED.
7. LIFT SUPPORT ASSEMBLY TO THE HOOK ON MAIN BEAM AND CHECK THAT CATCH LOCKS INTO PLACE.
8. ATTACH SUPPORT ASSEMBLY TO BOTTOM FUSELAGE ATTACHMENT POINTS, UTILIZING THE PINS PROVIDED.
9. IN THE FUSELAGE CHECK THAT TRUNNIONS ARE FULLY OUTBOARD, FORWARD ENGINE MOUNT HELD OUT OF THE WAY, AND WHEEL WELL BLISTER ACCESS DOORS REMOVED. RELEASE CARRIAGE FROM CRANE AND SLIDE ENGINE ALONG THE BEAM INTO FUSELAGE, ENGAGING ROLLER IN FUSELAGE GUIDE TRACK.
10. SLIDE TRUNNIONS TOWARD THE ENGINE AND ENGAGE WITH ENGINE TRUNNION BALLS. CLOSE MATING HALVES AND RUN NUTS FINGER TIGHT.
11. INSERT TAPER PINS.
12. ADJUST AND SECURE FRONT MOUNT SO THAT ROLLER CLEARS LOWER SURFACE OF GUIDE TRACK BY 1/16 (+ 1/32, -0) INCH. FOR OTHER CLEARANCES AND CONNECTIONS OF ENGINE SERVICES REFER TO THE TEXT AND ILLUSTRATIONS IN THIS SECTION.
13. TORQUE NUTS.
14. RELEASE GUIDE SLING.



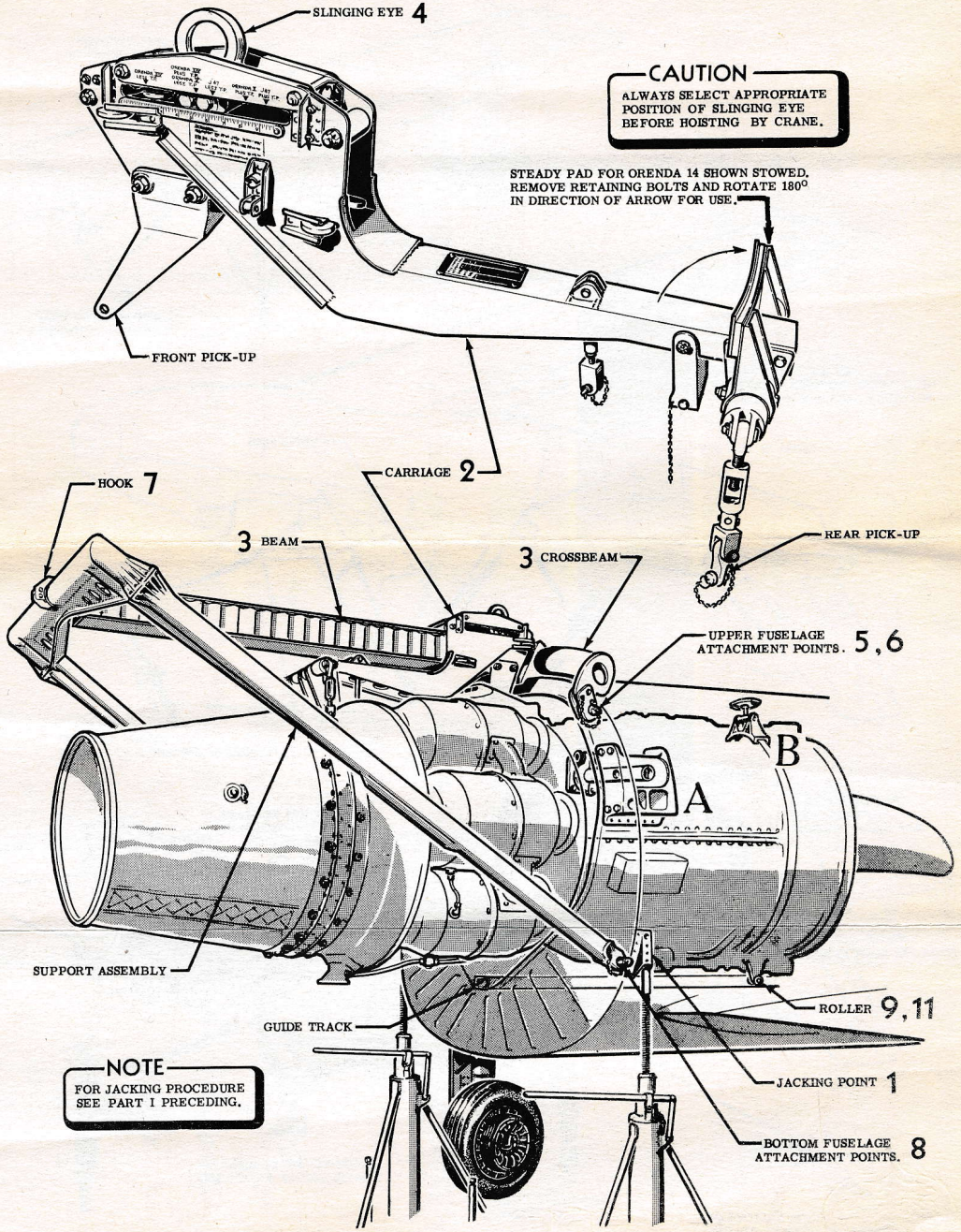

INSERT
SHOULDER MUST NOT PROJECT MORE THAN .062
MIN .002" BETWEEN HALVES AFTER TORQUING
11 TAPER PIN
10 TRUNNION
TORQUE 100-125 IN LBS
10 RIGHT SIDE TRUNNION BALL-FIXED
DETAIL A
13 270-300 IN. LBS (220-243 IN LBS WITH ADAPTOR MST-40251 AND 13 INCH TORQUE WRENCH).



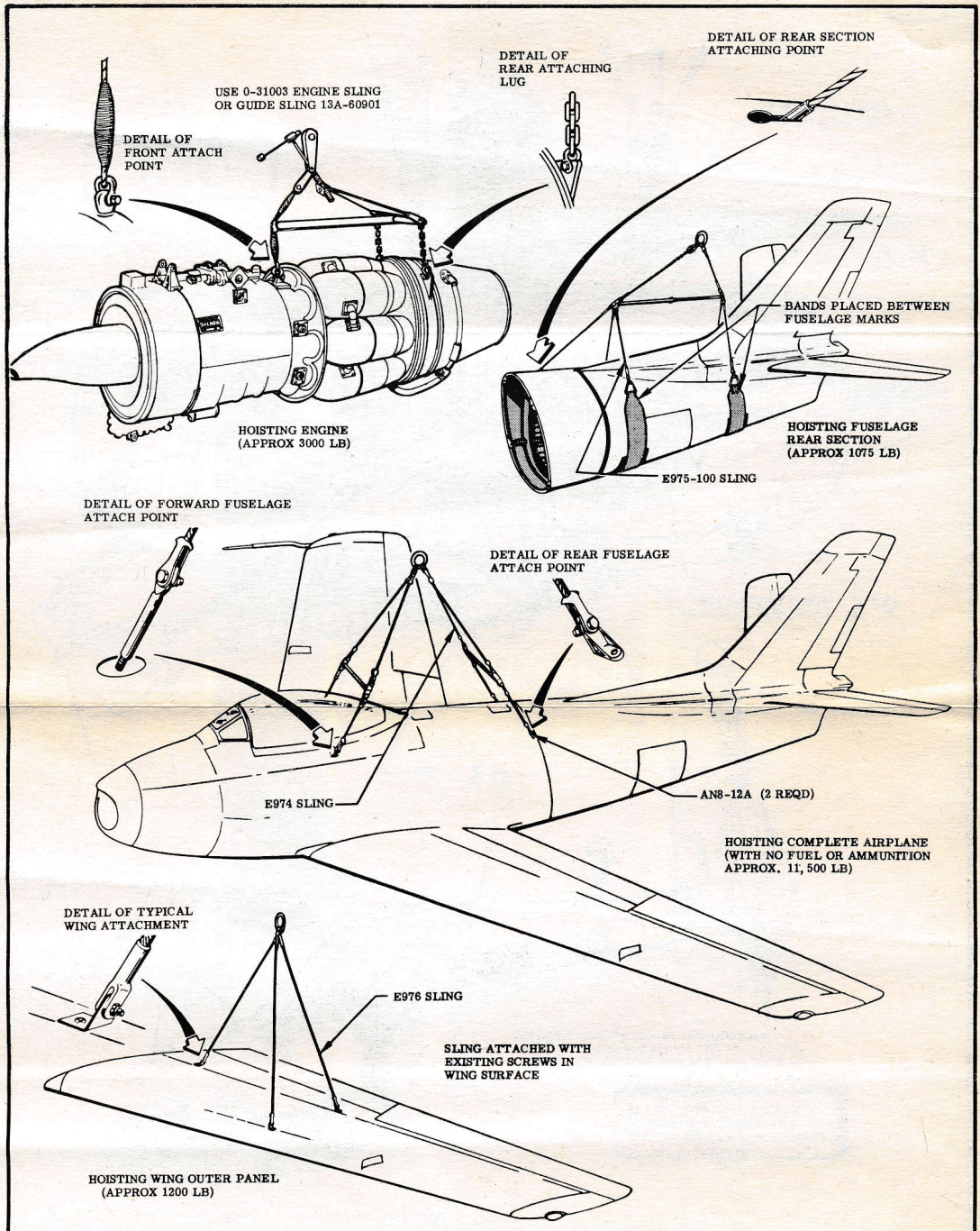
CAUTION:

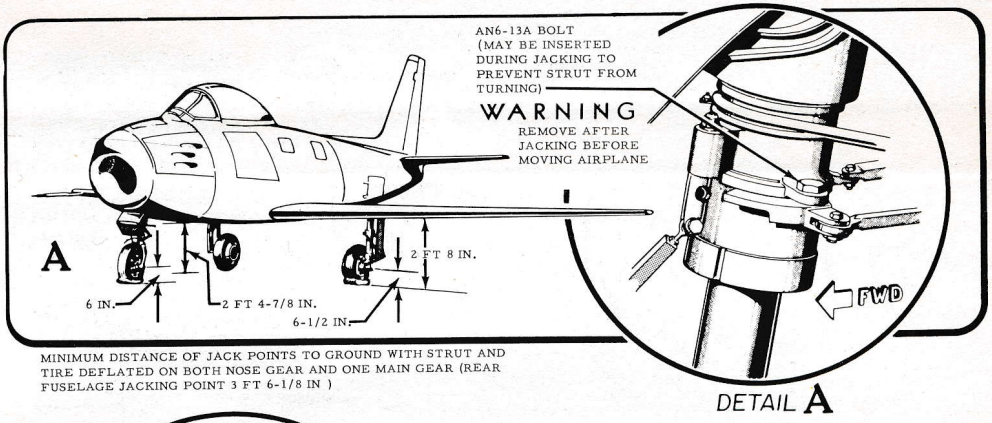
DO NOT TORQUE TRUNNIONS UNTIL FORWARD ENGINE MOUNTING IS CORRECTLY ADJUSTED.

5E2-05-63A

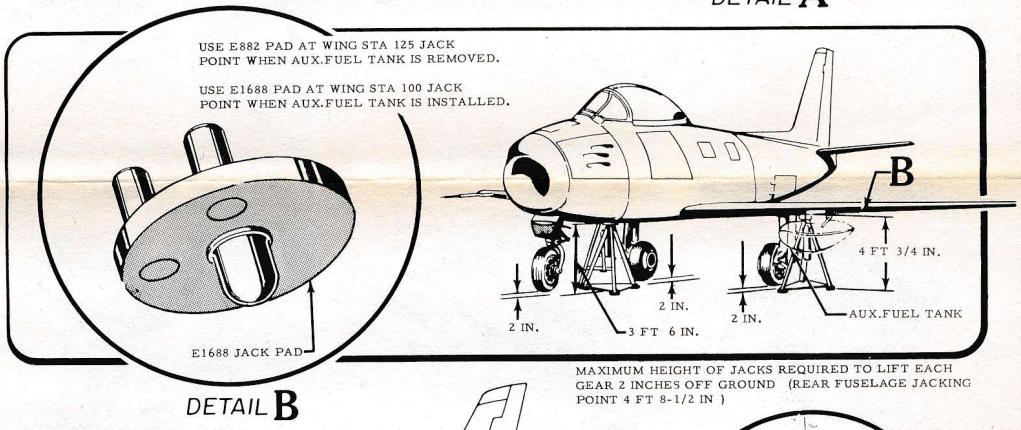

SLINGING EYE 4
CAUTION
ALWAYS SELECT APPROPRIATE POSITION OF SLINGING EYE BEFORE HOISTING BY CRANE.
STEADY PAD FOR ORENDA 14 SHOWN STOWED. REMOVE RETAINING BOLTS AND ROTATE 180° IN DIRECTION OF ARROW FOR USE.
FRONT PICK-UP
CARRIAGE 2
HOOK 7
3 BEAM
3 CROSSBEAM
REAR PICK-UP
UPPER FUSELAGE ATTACHMENT POINTS. 5,6
B
A
SUPPORT ASSEMBLY
ROLLER 9,11
GUIDE TRACK
JACKING POINT 1
BOTTOM FUSELAGE ATTACHMENT POINTS. 8
NOTE
FOR JACKING PROCEDURE SEE PART 1 PRECEDING.

5E2-05-64B

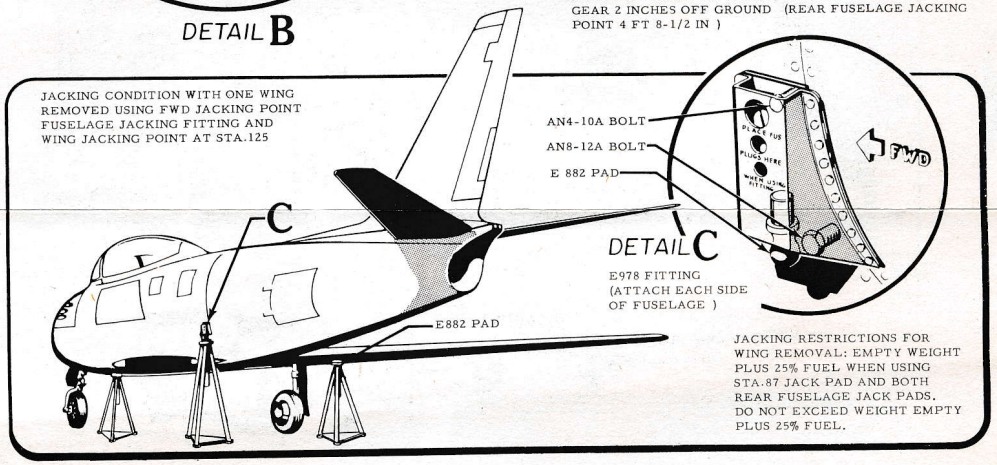

USE 0-31003 ENGINE SLING
OR GUIDE SLING 13A-60901
DETAIL OF
FRONT ATTACH
POINT
DETAIL OF
REAR ATTACHING
LUG
DETAIL OF REAR SECTION
ATTACHING POINT
BANDS PLACED BETWEEN
FUSELAGE MARKS
HOISTING ENGINE
(APPROX 3000 LB)
HOISTING FUSELAGE
REAR SECTION
(APPROX 1075 LB)
E975-100 SLING
DETAIL OF FORWARD FUSELAGE
ATTACH POINT
DETAIL OF REAR FUSELAGE
ATTACH POINT
E974 SLING
AN8-12A (2 REQD)
HOISTING COMPLETE AIRPLANE
(WITH NO FUEL OR AMMUNITION
APPROX. 11,500 LB)
DETAIL OF TYPICAL
WING ATTACHMENT
E976 SLING
SLING ATTACHED WITH
EXISTING SCREWS IN
WING SURFACE
HOISTING WING OUTER PANEL
(APPROX 1200 LB)



MINIMUM DISTANCE OF JACK POINTS TO GROUND WITH STRUT AND TIRE DEFLATED ON BOTH NOSE GEAR AND ONE MAIN GEAR (REAR FUSELAGE JACKING POINT 3 FT 6-1/8 IN)

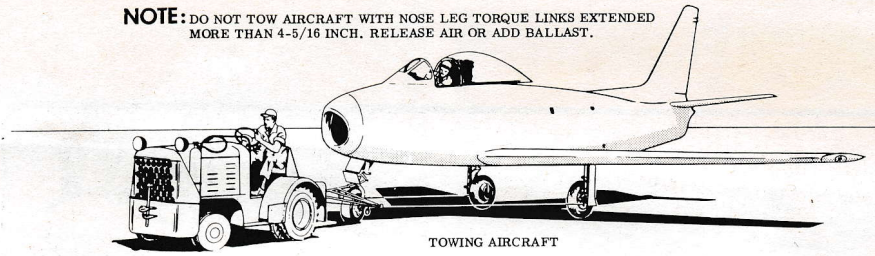


MAXIMUM HEIGHT OF JACKS REQUIRED TO LIFT EACH GEAR 2 INCHES OFF GROUND (REAR FUSELAGE JACKING POINT 4 FT 8-1/2 IN)



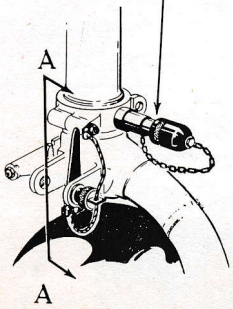
JACKING RESTRICTIONS FOR WING REMOVAL: EMPTY WEIGHT PLUS 25% FUEL WHEN USING STA.87 JACK PAD AND BOTH REAR FUSELAGE JACK PADS. DO NOT EXCEED WEIGHT EMPTY PLUS 25% FUEL.

NOTE: DO NOT TOW AIRCRAFT WITH NOSE LEG TORQUE LINKS EXTENDED MORE THAN 4-5/16 INCH. RELEASE AIR OR ADD BALLAST.

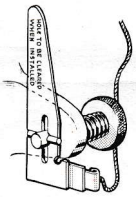


TOWING AIRCRAFT

NOSE GEAR STEERING RELEASE PIN (LOCKED POSITION)

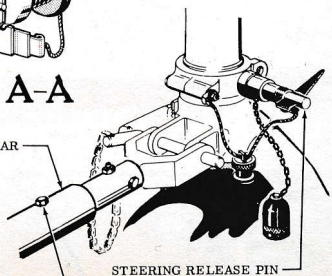


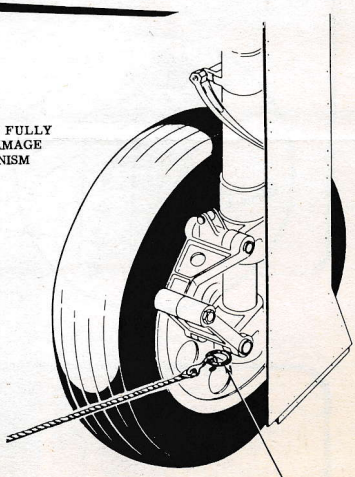
DECLUTCHING RELEASE PIN WEDGE ATTACHED TO TOWING LUG INSERT WEDGE IN NOSE GEAR STEERING RELEASE PIN BEFORE ATTACHING TOW BAR (SEE DETAIL B).



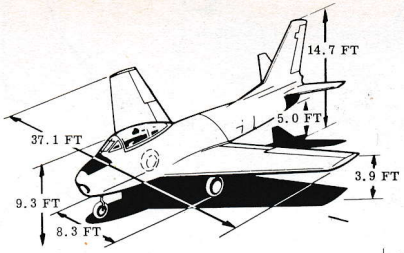
VIEW **A-A**

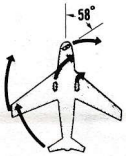
CAUTION: WEDGE MUST BE FULLY INSERTED, OTHERWISE DAMAGE TO THE STEERING MECHANISM MAY RESULT.

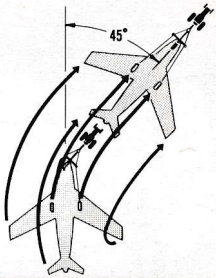


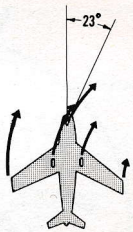


MAIN GEAR TOWING RING CABLES ARE ATTACHED HERE FOR TOWING ON ROUGH, MUDDY, OR SNOW COVERED GROUND.









NOTES:

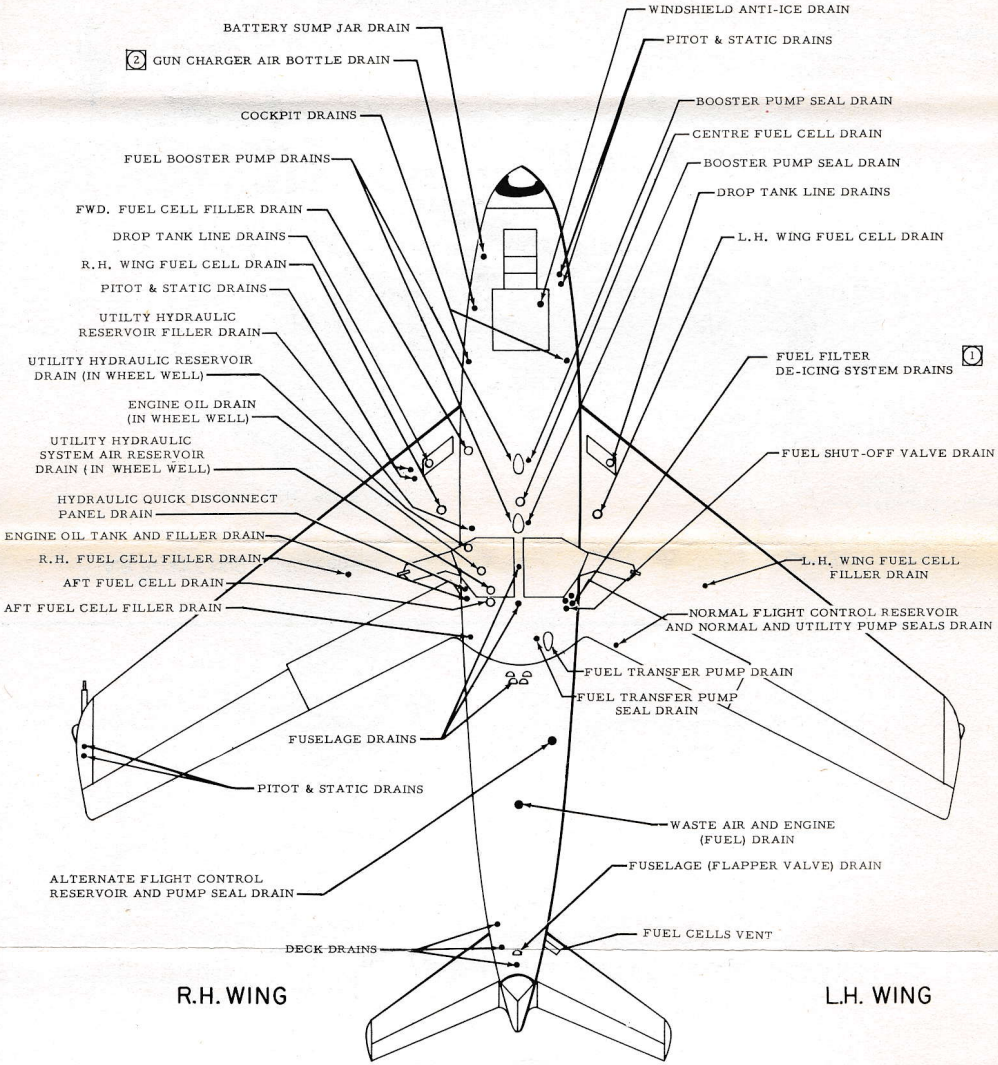
1. TO TOW AIRPLANE, REMOVE CAP AND INSERT WEDGE TO DISENGAGE STEERING COLLAR.
2. MAKE SURE TURNING AREA IS CLEAR OF OBSTRUCTIONS.
3. WEDGE MUST BE REMOVED BEFORE FLIGHT AND STEERING COLLAR PIN SAFETIED BY INSTALLATION OF CAP.

MINIMUM PULL OR PUSH TURN NOT LIMITED BY TOW-CABLE, NOSE LINKS DISENGAGED BY WEDGE,
MAX. ANGLE = 58°
TURNING CIRCLE = 60 FT.

PULL TURN BY TOW-BAR AND CABLE, NOSE LINKS DISENGAGED BY WEDGE,
MAXIMUM ANGLE = 45°
(LIMITED BY TOW CABLE),
TURNING CIRCLE = 100 FT.

POWER TURN UNDER FULL STEERING, TURNING CIRCLE EQUALS:
NORMAL 108 FT. (23°),
MAXIMUM 116 FT. (21°),
MINIMUM 95 FT. (29°).

5E2-01-11A


BATTERY SUMP JAR DRAIN
2 GUN CHARGER AIR BOTTLE DRAIN
COCKPIT DRAINS
FUEL BOOSTER PUMP DRAINS
FWD. FUEL CELL FILLER DRAIN
DROP TANK LINE DRAINS
R.H. WING FUEL CELL DRAIN
PITOT & STATIC DRAINS
UTILTY HYDRAULIC RESERVOIR FILLER DRAIN
UTILITY HYDRAULIC RESERVOIR DRAIN (IN WHEEL WELL)
ENGINE OIL DRAIN (IN WHEEL WELL)
UTILITY HYDRAULIC SYSTEM AIR RESERVOIR DRAIN (IN WHEEL WELL)
HYDRAULIC QUICK DISCONNECT PANEL DRAIN
ENGINE OIL TANK AND FILLER DRAIN
R.H. FUEL CELL FILLER DRAIN
AFT FUEL CELL DRAIN
AFT FUEL CELL FILLER DRAIN
FUSELAGE DRAINS
PITOT & STATIC DRAINS
ALTERNATE FLIGHT CONTROL RESERVOIR AND PUMP SEAL DRAIN
DECK DRAINS
WINDSHIELD ANTI-ICE DRAIN
PITOT & STATIC DRAINS
BOOSTER PUMP SEAL DRAIN
CENTRE FUEL CELL DRAIN
BOOSTER PUMP SEAL DRAIN
DROP TANK LINE DRAINS
L.H. WING FUEL CELL DRAIN
FUEL FILTER DE-ICING SYSTEM DRAINS 1
FUEL SHUT-OFF VALVE DRAIN
L.H. WING FUEL CELL FILLER DRAIN
NORMAL FLIGHT CONTROL RESERVOIR AND NORMAL AND UTILITY PUMP SEALS DRAIN
FUEL TRANSFER PUMP DRAIN
FUEL TRANSFER PUMP SEAL DRAIN
WASTE AIR AND ENGINE (FUEL) DRAIN
FUSELAGE (FLAPPER VALVE) DRAIN
FUEL CELLS VENT
R.H. WING
L.H. WING

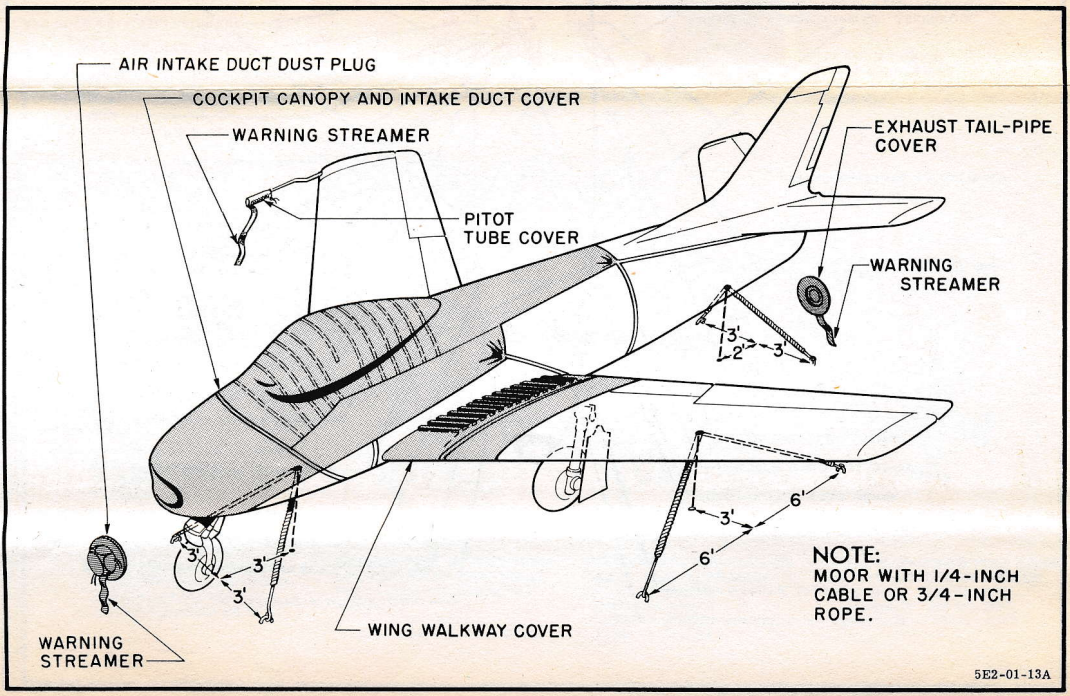
1 AIRCRAFT 23001 TO 23210

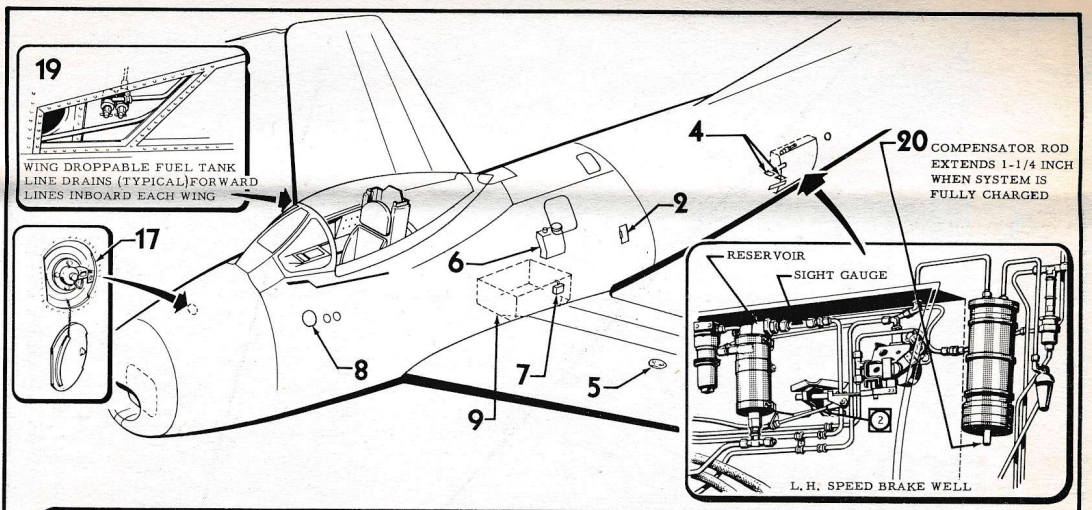
2 AIRCRAFT 23001 TO 23300

WARNING

WHENEVER THE ENGINE FUEL SYSTEM HAS BEEN OPENED FOR DRAINING OR ANY OTHER PURPOSE, ALL AIR MUST BE BLED FROM THE SYSTEM.

5E2-01-20


AIR INTAKE DUCT DUST PLUG
COCKPIT CANOPY AND INTAKE DUCT COVER
WARNING STREAMER
PITOT TUBE COVER
EXHAUST TAIL-PIPE COVER
WARNING STREAMER
3'
2'
3'
3'
3'
3'
3'
6'
6'
NOTE:
MOOR WITH 1/4-INCH CABLE OR 3/4-INCH ROPE.
WARNING STREAMER
WING WALKWAY COVER
5E2-01-13A



1 DELETED

2 EXTERNAL ELECTRICAL POWER RECEPTACLE.

3 FLIGHT CONTROL HYDRAULIC ACCUMULATOR AIR FILLERS AND PRESSURE GAUGES IN R.H. SPEED BRAKE WELL.

4 NORMAL AND ALTERNATE FLIGHT CONTROL HYDRAULIC SYSTEM FILLERS (ON BOTTOM OF FUSELAGE)

5 FUEL FILLER

6 FUEL FILTER DE-ICING TANK FILLER. [2]

7 NORMAL FLIGHT CONTROL HYDRAULIC ACCUMULATOR AIR FILLER

8 HYDRAULIC BRAKE EQUIPMENT

9 MAIN GEAR SHOCK STRUT SERVICING (ACCESS BOTH WHEEL WELLS).

10 HYDRAULIC DISCONNECTS.

11 HYDRAULIC TEST STAND CONNECTIONS.

12 ENGINE OIL TANK FILLER.

13 HYDRAULIC UTILITY SYSTEM RESERVOIR FILLER.

14 SPEED BRAKES HYDRAULIC SYSTEM ACCUMULATOR AIR FILLER. [1]

15 GUN CHARGER AIR COMPRESSOR OIL AND AIR FILLERS.

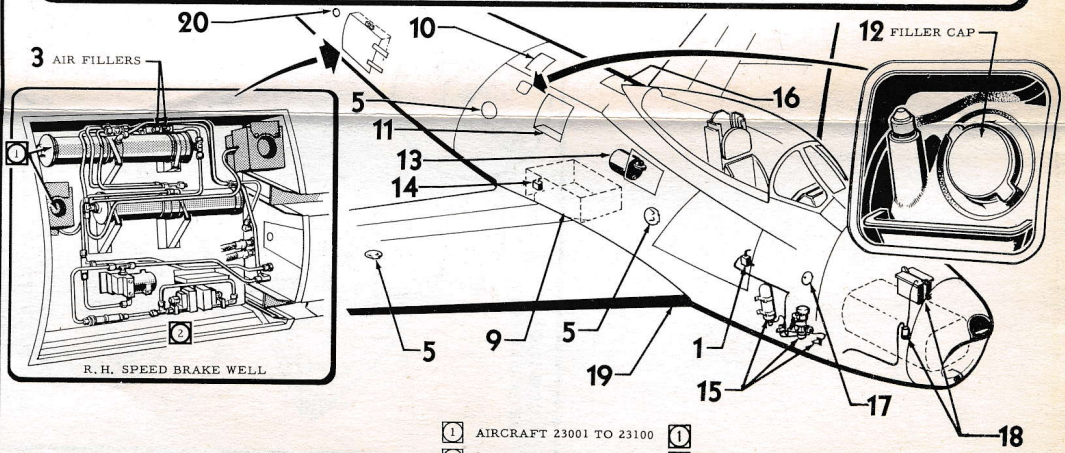
16 AIR COOLING UNIT TURBINE ACCESS.

17 OXYGEN FILLER VALVE.

18 BATTERY AND SUMP JAR (SERVICED THROUGH RADAR DOOR).

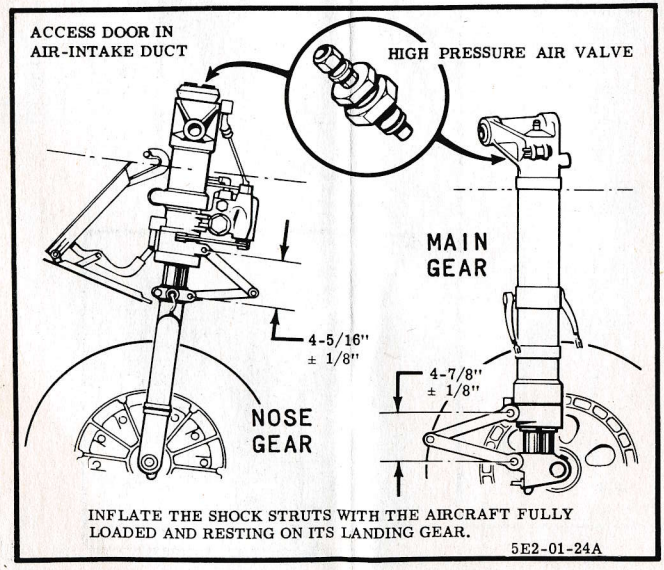
19 DRAINS, DROPPABLE FUEL TANK LINES.

20 FLIGHT CONTROL SYSTEM HYDRAULIC COMPENSATORS (AFT OF SPEED BRAKE WELLS).

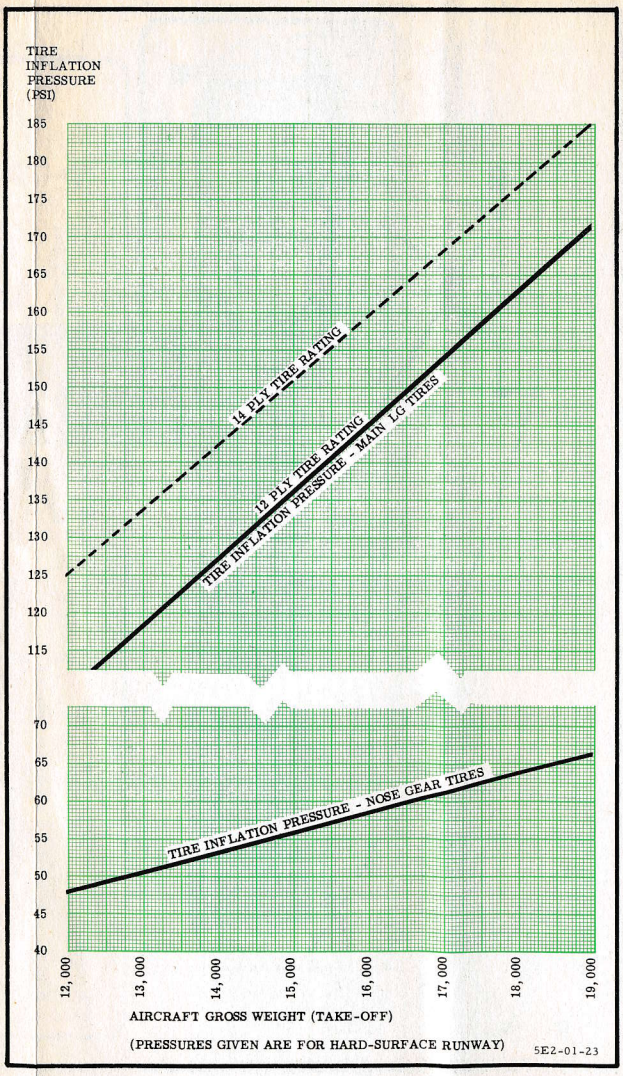


[1] AIRCRAFT 23001 TO 23100 [1]
[2] AIRCRAFT 23001 TO 23210 [2]

5E2-01-18A

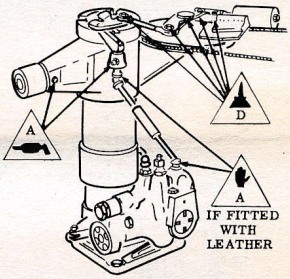


Measuring Gear Strut Extension



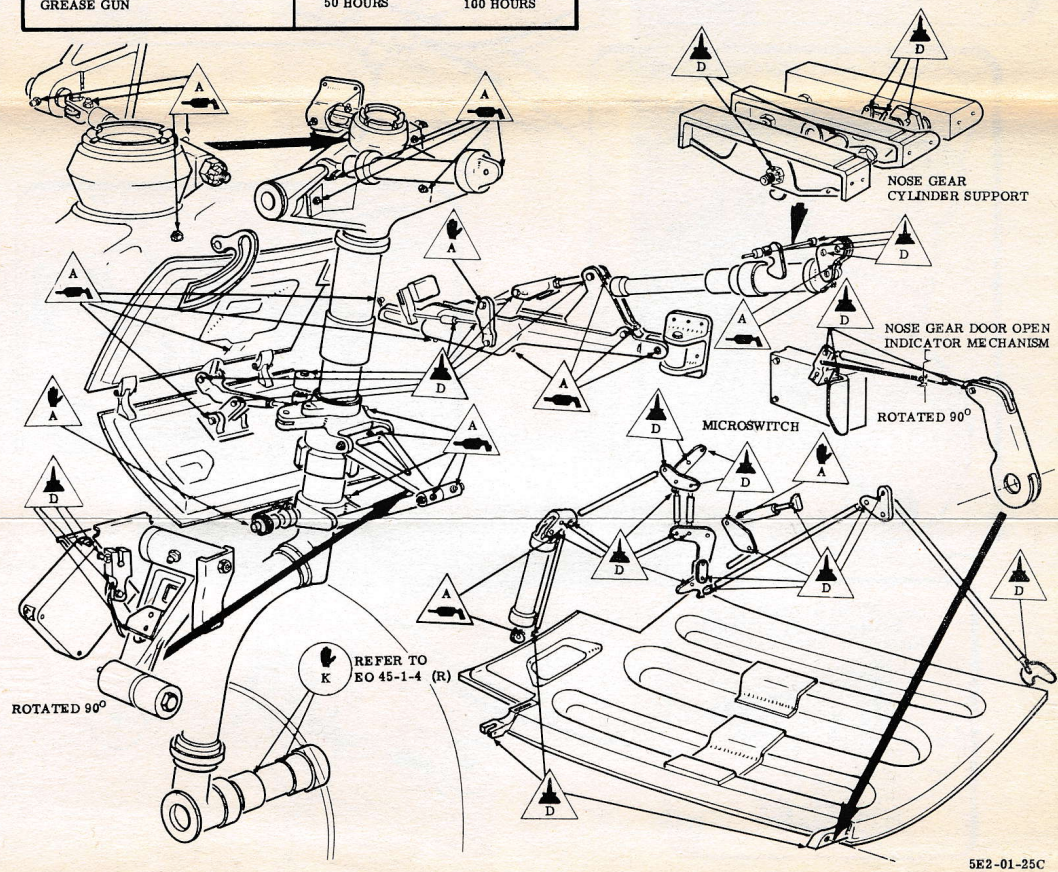
 Tire Inflation Chart

TABLE OF LUBRICANTS		
IDENTIFICATION LETTER	SPECIFICATION	TYPE OF LUBRICANT
A	3-GP-683A (MIL-G-3278)	GREASE, LOW AND HIGH TEMPERATURE LUBRICATING.
C	3-GP-641 (MIL-G-7187)	GREASE, GRAPHITED.
D	3-GP-335A (MIL-L-7870)	OIL, GENERAL - PURPOSE LOW TEMPERATURE, ANTI-CORROSIVE
J	MIL-G-7118	GREASE (EXTREME PRESSURE) LOW TEMPERATURE
K	3-GP-690 (MIL-L-3545)	GREASE, HIGH TEMPERATURE, WATER - RESISTANT
W	3-GP-665 (AN-P-51)	PETROLATUM (JELLY, MINERAL)
APPLICATION SYMBOLS: BRUSH, OIL CAN, HAND, GREASE GUN		FREQUENCY SYMBOLS: 1st PERIODIC 50 HOURS; 2nd PERIODIC 100 HOURS

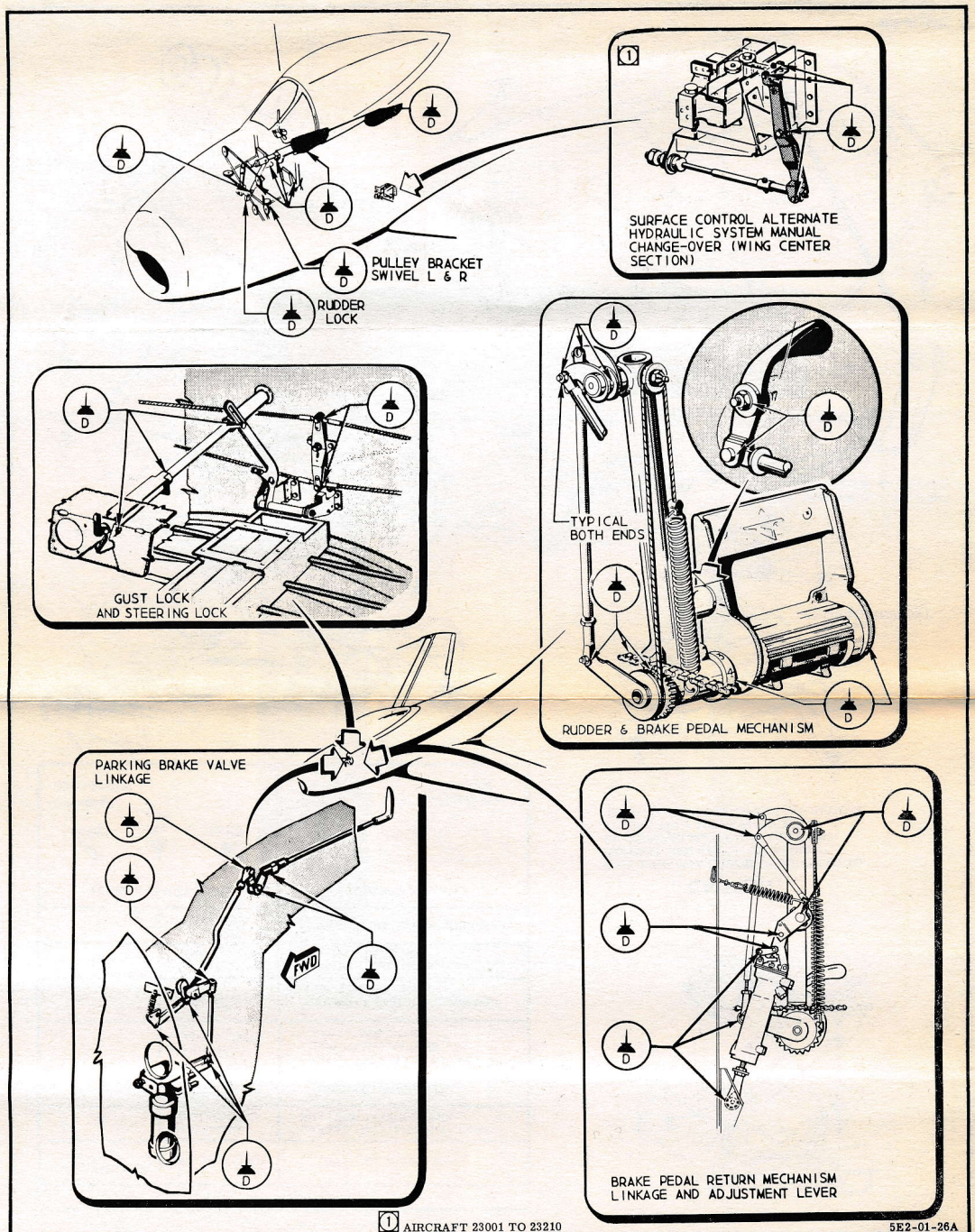


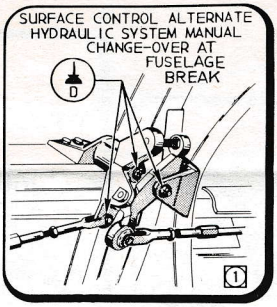
CAUTION:

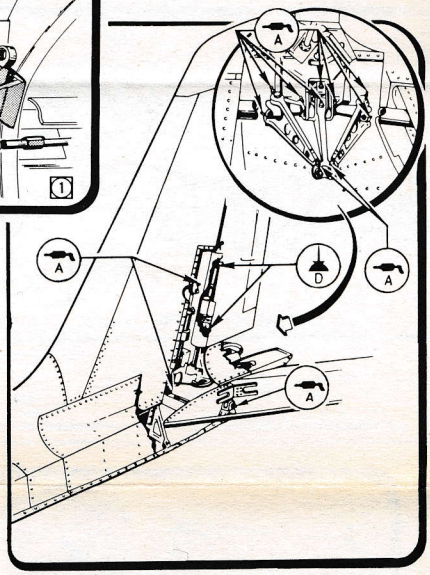
SPEC 3-GP-683A GREASE IS INJURIOUS TO NATURAL AND SYNTHETIC RUBBERS, ELECTRICAL MATERIALS AND PAINT. ENSURE THAT SURPLUS GREASE IS REMOVED AFTER GREASING OPERATIONS.

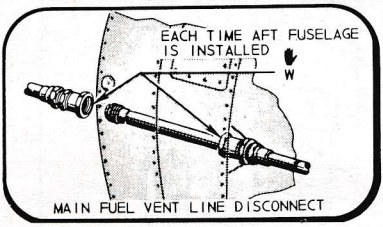


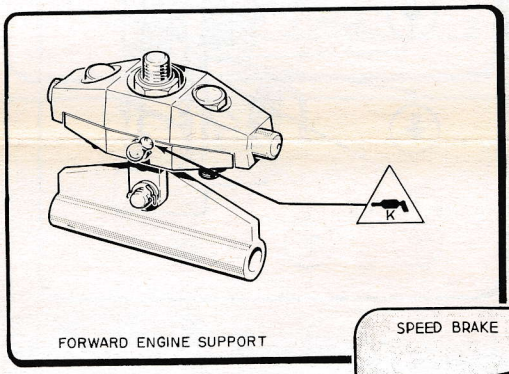
Lubrication Chart
Sheet 1 of 5

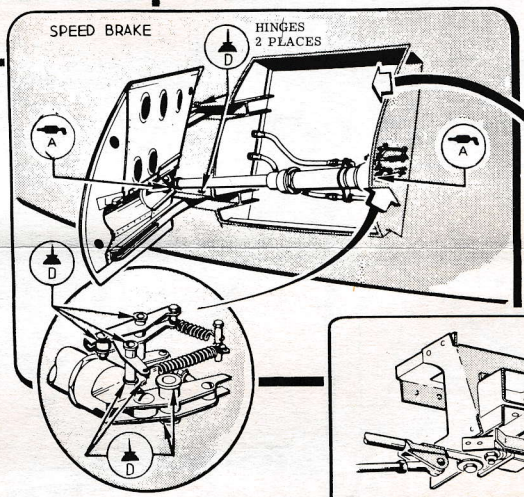

PULLEY BRACKET SWIVEL L & R
RUDDER LOCK
SURFACE CONTROL ALTERNATE HYDRAULIC SYSTEM MANUAL CHANGE-OVER (WING CENTER SECTION)
GUST LOCK AND STEERING LOCK
TYPICAL BOTH ENDS
RUDDER & BRAKE PEDAL MECHANISM
PARKING BRAKE VALVE LINKAGE
FWD
BRAKE PEDAL RETURN MECHANISM LINKAGE AND ADJUSTMENT LEVER
1 AIRCRAFT 23001 TO 23210
5E2-01-26A

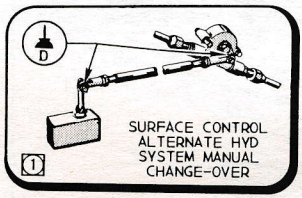


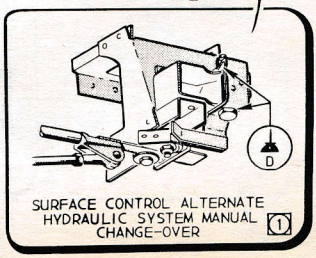








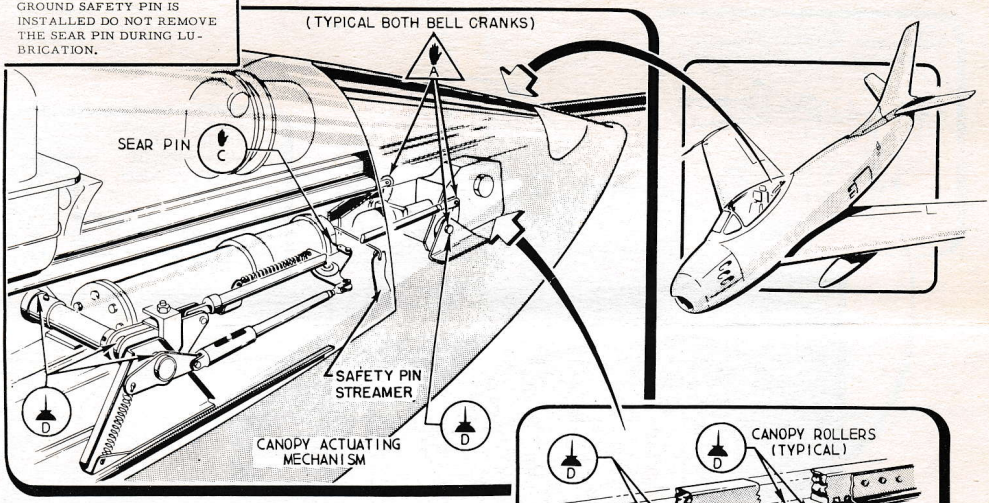


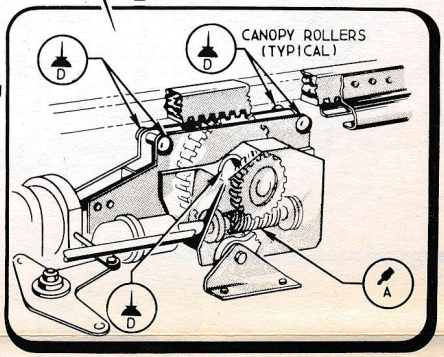


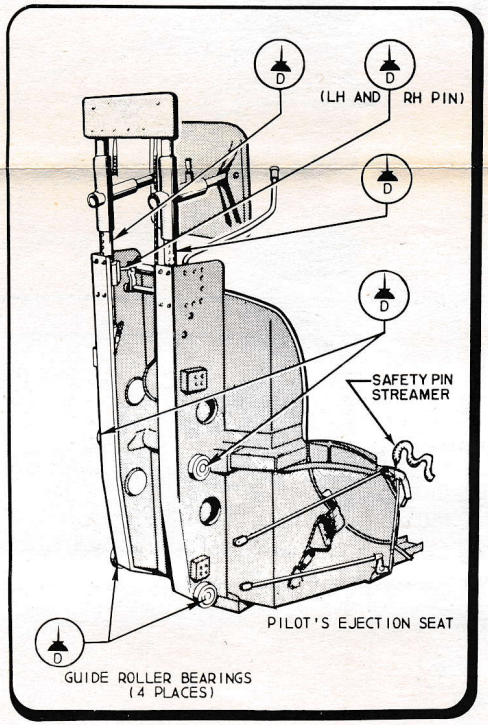
1 AIRCRAFT 23001 TO 23210

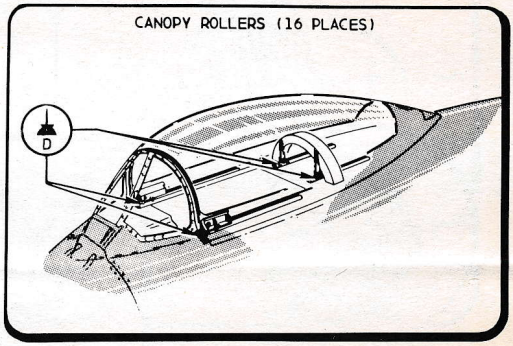
5E2-01-27A

WARNING: UNLESS THE GROUND SAFETY PIN IS INSTALLED DO NOT REMOVE THE SEAR PIN DURING LUBRICATION.

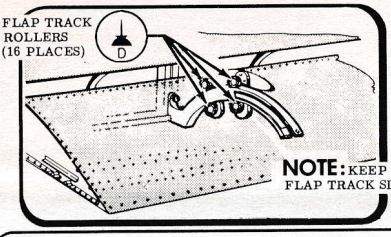






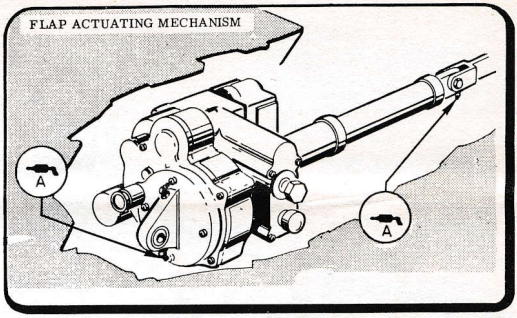


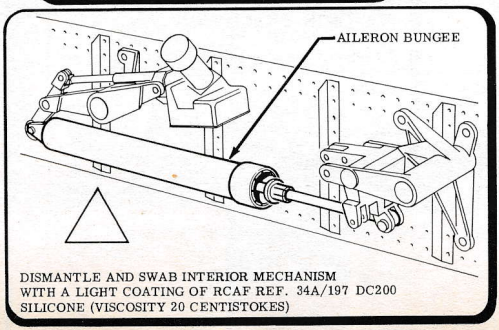
FLAP TRACK ROLLERS (16 PLACES)



NOTE: KEEP OIL OFF FLAP TRACK SIDE FACES

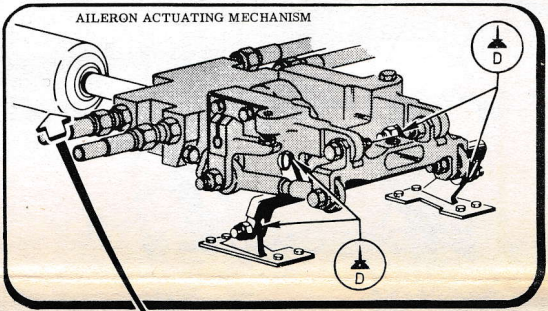
FLAP ACTUATING MECHANISM



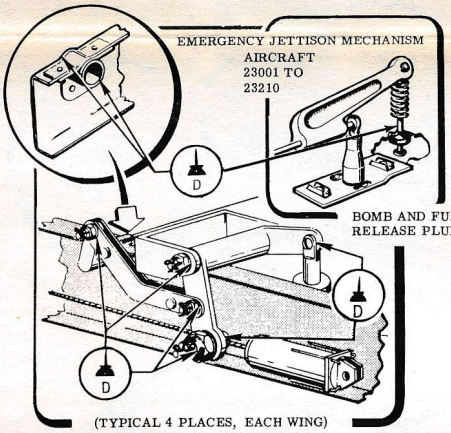


DISMANTLE AND SWAB INTERIOR MECHANISM WITH A LIGHT COATING OF RCAF REF. 34A/197 DC200 SILICONE (VISCOSITY 20 CENTISTOKES)

AILERON ACTUATING MECHANISM



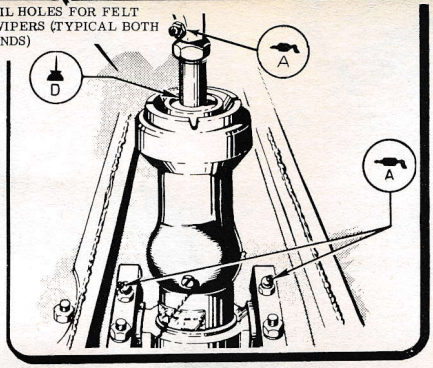
EMERGENCY JETTISON MECHANISM AIRCRAFT 23001 TO 23210



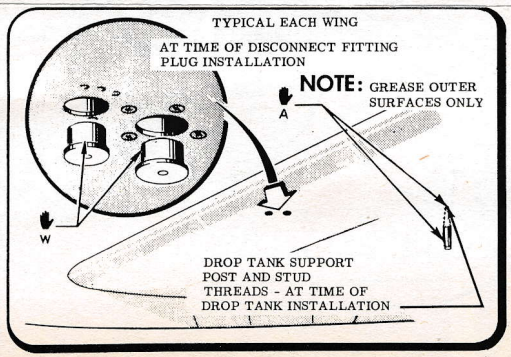
BOMB AND FUEL TANK RELEASE PLUNGER

(TYPICAL 4 PLACES, EACH WING)

OIL HOLES FOR FELT WIPERS (TYPICAL BOTH ENDS)

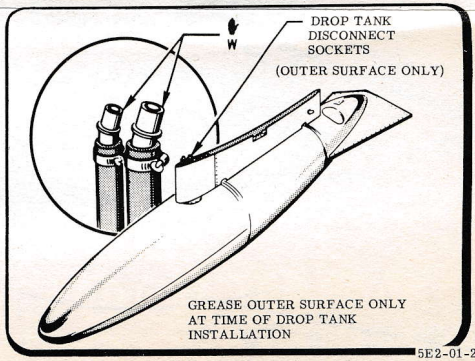


TYPICAL EACH WING AT TIME OF DISCONNECT FITTING PLUG INSTALLATION



NOTE: GREASE OUTER SURFACES ONLY

DROP TANK SUPPORT POST AND STUD THREADS - AT TIME OF DROP TANK INSTALLATION



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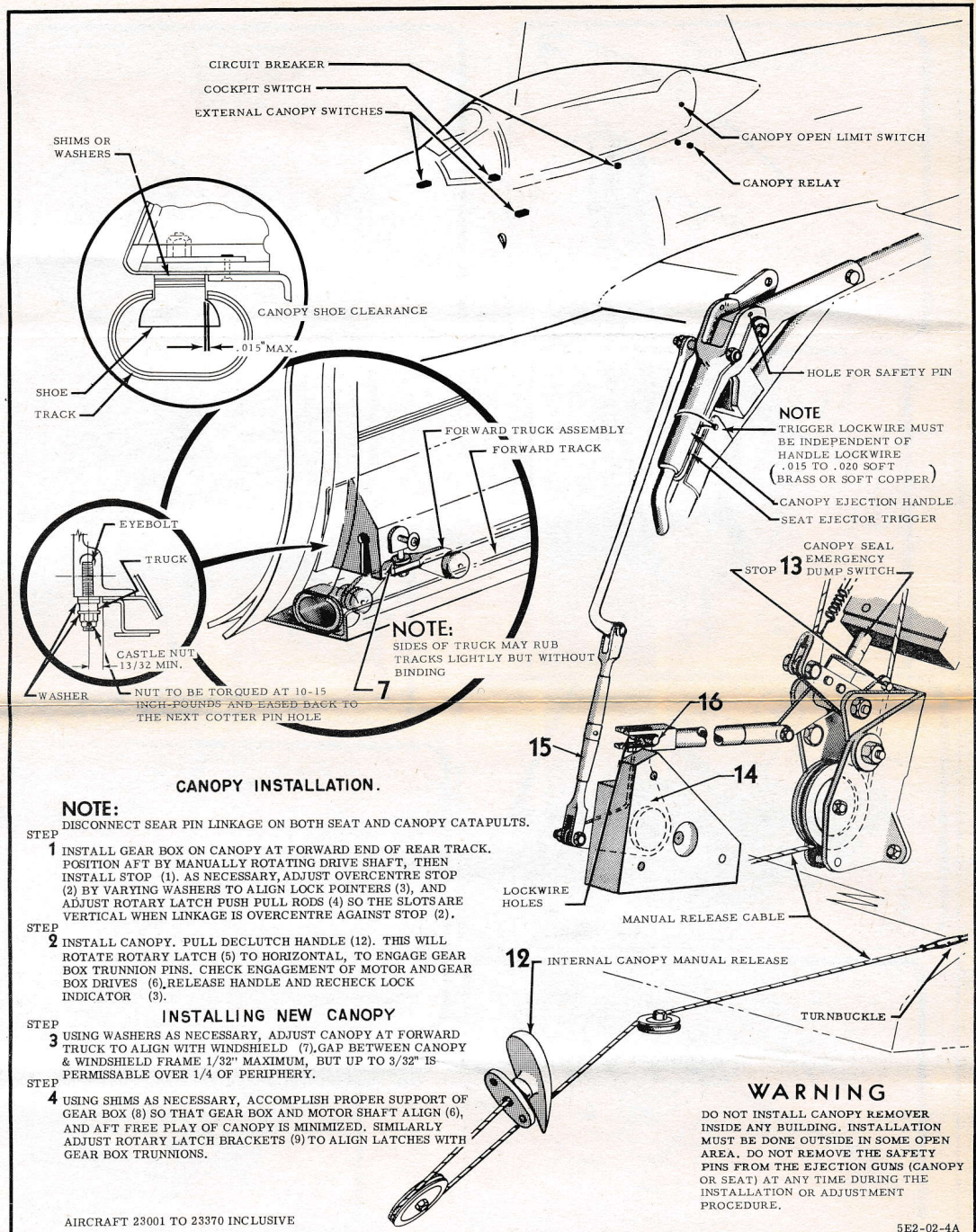

CANOPY INSTALLATION.

NOTE:
DISCONNECT SEAR PIN LINKAGE ON BOTH SEAT AND CANOPY CATAPULTS.

STEP **1** INSTALL GEAR BOX ON CANOPY AT FORWARD END OF REAR TRACK. POSITION AFT BY MANUALLY ROTATING DRIVE SHAFT, THEN INSTALL STOP (1). AS NECESSARY, ADJUST OVERCENTRE STOP (2) BY VARYING WASHERS TO ALIGN LOCK POINTERS (3), AND ADJUST ROTARY LATCH PUSH PULL RODS (4) SO THE SLOTS ARE VERTICAL WHEN LINKAGE IS OVERCENTRE AGAINST STOP (2).

STEP **2** INSTALL CANOPY. PULL DECLUTCH HANDLE (12). THIS WILL ROTATE ROTARY LATCH (5) TO HORIZONTAL, TO ENGAGE GEAR BOX TRUNNION PINS. CHECK ENGAGEMENT OF MOTOR AND GEAR BOX DRIVES (6). RELEASE HANDLE AND RECHECK LOCK INDICATOR (3).

INSTALLING NEW CANOPY

STEP **3** USING WASHERS AS NECESSARY, ADJUST CANOPY AT FORWARD TRUCK TO ALIGN WITH WINDSHIELD (7). GAP BETWEEN CANOPY & WINDSHIELD FRAME 1/32" MAXIMUM, BUT UP TO 3/32" IS PERMISSABLE OVER 1/4 OF PERIPHERY.

STEP **4** USING SHIMS AS NECESSARY, ACCOMPLISH PROPER SUPPORT OF GEAR BOX (8) SO THAT GEAR BOX AND MOTOR SHAFT ALIGN (6), AND AFT FREE PLAY OF CANOPY IS MINIMIZED. SIMILARLY ADJUST ROTARY LATCH BRACKETS (9) TO ALIGN LATCHES WITH GEAR BOX TRUNNIONS.

WARNING

DO NOT INSTALL CANOPY REMOVER INSIDE ANY BUILDING. INSTALLATION MUST BE DONE OUTSIDE IN SOME OPEN AREA. DO NOT REMOVE THE SAFETY PINS FROM THE EJECTION GUNS (CANOPY OR SEAT) AT ANY TIME DURING THE INSTALLATION OR ADJUSTMENT PROCEDURE.

AIRCRAFT 23001 TO 23370 INCLUSIVE

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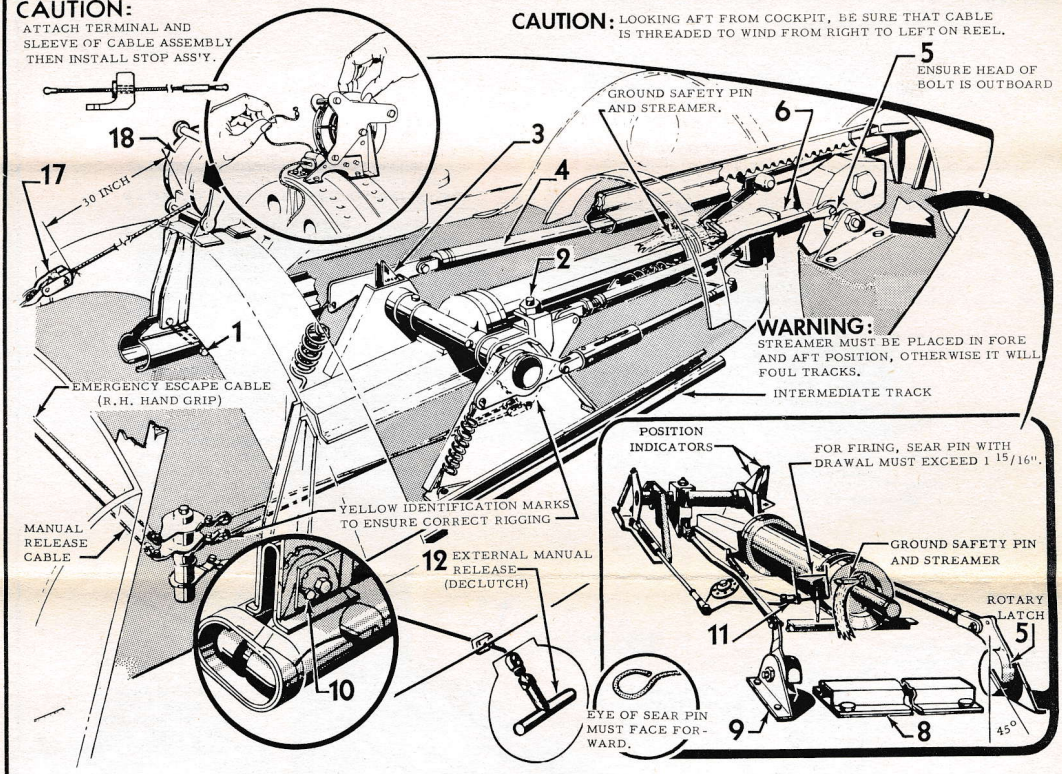


STEP **5** CHECK CANOPY SKIRT FOR 1/16" MINIMUM CLEARANCE.

STEP **6** ADJUST TRUCKS AT INTERMEDIATE TRACK TO MOVE FREELY WITHIN TRACK (10).

STEP **7** USING INSIDE MANUAL RELEASE, CLOSE CANOPY AND CHECK FOR FREEDOM OF MOVEMENT AND CLEARANCE FROM PRESSURE SEAL. SEAL BOLT HEADS (8 & 9) WITH EC 801 AND CHECK PRESSURIZATION. (REFER TO PART 4).

STEP **8** CONNECT ELECTRIC WIRING.

STEP **9** ENGAGE INERTIA REEL CABLE IN QUICK DISCONNECT FITTING (17). (FOR RIGGING OF CABLE, SEE STEP 14).

ADJUSTING CANOPY EMERGENCY RELEASE SYSTEM

NOTE:
SEAT CATAPULT SEAR LINKAGE DISCONNECTED. INSTALL DUMMY CANOPY CATAPULT.

STEP **10** CONNECT CANOPY CATAPULT SEAR PIN TO BELL CRANK LINK (11).

STEP **11** CHECK LOCK INDICATOR POINTERS, OVERCENTRE STOP AND ROTARY LATCHES AS OUTLINED IN STEP 1; THEN ADJUST TENSION OF CABLES TO ELIMINATE SLACK, BEING CAREFUL NOT TO CHANGE POSITION OF ANY LINKAGE OR BELL CRANK. BELLCRANK AT CANOPY SEAL EMERGENCY DUMP SWITCH SHOULD BE AGAINST IT S STOP (13). SEAL DUMP MICRO-SWITCH SHOULD HAVE 1/16 TRAVEL BEFORE PLUNGER BOTTOMS. BELLCRANK TRUNNION MUST ENGAGE FORKED END OF PUSHROD (16).

CAUTION:
BELLCRANK TRUNNION MUST BE RIGGED AS SHOWN (14).

STEP **12** PLACE SEAT IN MID POSITION. THERE SHOULD BE 1/32" MINIMUM CLEARANCE BETWEEN BELL CRANK TRUNNION AND FORK END OF PUSHROD (16). ADJUST TURNBUCKLE AS NECESSARY (15).

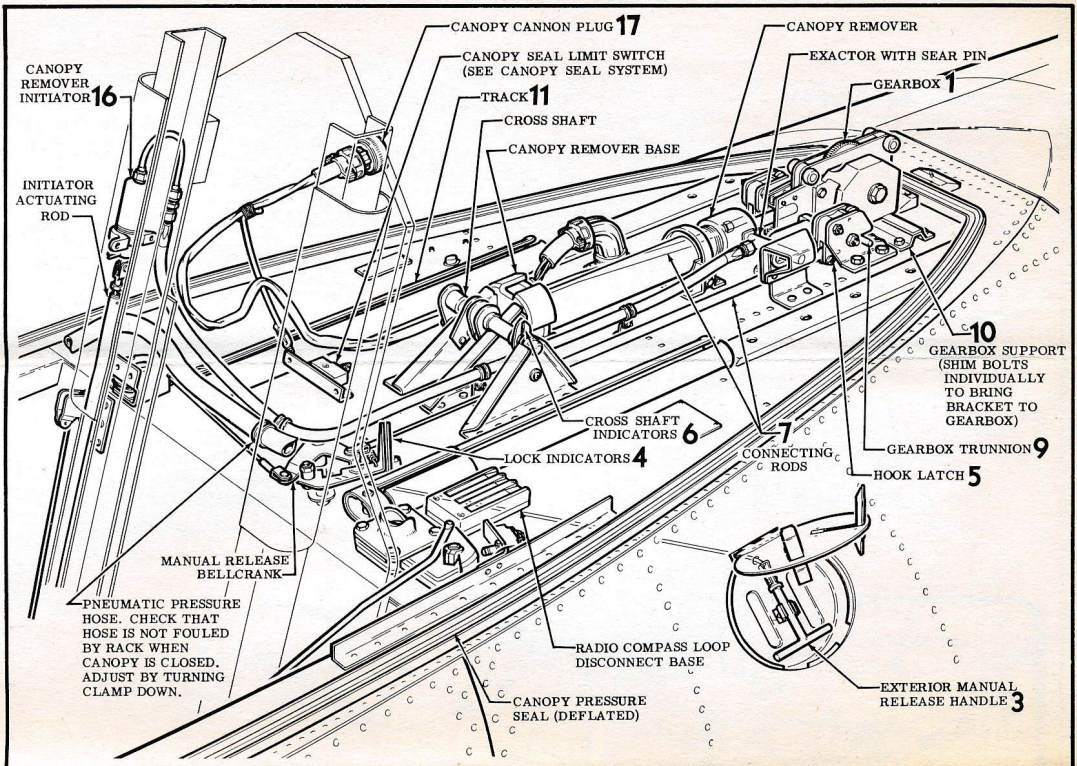
STEP **13** PLACE SEAT IN UPPERMOST POSITION AND SLOWLY RAISE RIGHT HANDGRIP. AT 60°, SEAT FIRING TRIGGER SHOULD REMAIN IN STOWED POSITION, LATCH ROTATION SHOULD BE LESS THAN 45°, AND SEAR PIN SHOULD START TO WITHDRAW. WHEN ROTARY LATCHES HAVE ROTATED 45°, SEAR PIN WITHDRAWAL SHOULD BE 1 7/8". WHEN HANDGRIP HANDLE IS FULLY UP AND LOCKED, SEAR PIN WITHDRAWAL SHOULD BE MORE THAN 1 15/16" AND LATCHES ROTATED MORE THAN 45°. THE PULL REQUIRED TO RAISE THE HANDGRIP SHOULD NOT EXCEED 45 POUNDS.

STEP **14** ADJUST BREAK-OUT LOAD ON CANOPY INERTIA REEL 3/4 TO 1 POUND. CABLE SHOULD EXTEND 30" MINIMUM BEFORE REEL BOTTOMS. CABLE MUST WIND FROM RIGHT TO LEFT ON REEL, LOOKING AFT (18).

STEP **15** MOVE AIRCRAFT OUT OF HANGAR. INSTALL LOADED CANOPY CATAPULT. REPLACE SAFETY PIN WITH 1/16 DRILL ROD. TEST SEAR PIN ACTION.

STEP **16** CONNECT SEAT CATAPULT SEAR LINKAGE. WIRELOCK HANDLE AND TRIGGER INDEPENDENTLY. INSTALL SAFETY PINS.

AIRCRAFT 23001 TO 23370 INCLUSIVE


CANOPY CANNON PLUG 17
CANOPY SEAL LIMIT SWITCH (SEE CANOPY SEAL SYSTEM)
TRACK 11
CROSS SHAFT
CANOPY REMOVER BASE
CANOPY REMOVER
EXACTOR WITH SEAR PIN
GEARBOX 1
CANOPY REMOVER INITIATOR 16
INITIATOR ACTUATING ROD
10 GEARBOX SUPPORT (SHIM BOLTS INDIVIDUALLY TO BRING BRACKET TO GEARBOX)
CROSS SHAFT INDICATORS 6
7 CONNECTING RODS
GEARBOX TRUNNION 9
LOCK INDICATORS 4
HOOK LATCH 5
MANUAL RELEASE BELLCRANK
PNEUMATIC PRESSURE HOSE. CHECK THAT HOSE IS NOT FOULED BY RACK WHEN CANOPY IS CLOSED. ADJUST BY TURNING CLAMP DOWN.
RADIO COMPASS LOOP DISCONNECT BASE
EXTERIOR MANUAL RELEASE HANDLE 3
CANOPY PRESSURE SEAL (DEFLATED)

INSTALLING NEW CANOPY

STEPS:

1 INSTALL GROUND SAFETY PIN IN ALL THREE INITIATORS (16). WITH LATCHES (5) CLOSED INSERT RIG PIN THROUGH LATCH BRACKETS. ADJUST CONNECTING RODS (7) UNTIL CROSS SHAFT INDICATORS (6) ARE ALIGNED. SEE DETAIL A.

2 POSITION GEAR BOX (1) AT FORWARD END OF RACK IN CANOPY BY TURNING DRIVE. PULL OUT EXTERNAL MANUAL RELEASE HANDLE (3) UNTIL LOCK INDICATORS (4) SHOW LATCHES OPEN AND LOCKED. SEE DETAIL B.

3 INSTALL CANOPY WITH TRUCKS AT REAR END OF TRACKS (8 AND 11). SLIDE CANOPY FORWARD UNTIL GEAR BOX TRUNNIONS (9) SLIDE INTO LATCH GROOVES AND GEAR BOX DRIVE SLIDES INTO MOTOR DRIVE. IF NECESSARY TURN GEAR BOX DRIVE(1) MANUALLY TO OBTAIN ALIGNMENT (2). SEE DETAIL C.

4 CLOSE LATCHES BY SQUEEZING POINTERS (4). CLOSE CANOPY TO CHECK ALIGNMENT AND CLEARANCE. USING WASHERS AS REQUIRED ADJUST FORWARD TRUCKS TO ALIGN CANOPY WITH WINDSHIELD. CLEARANCE 1/32 IN., BUT 3/32 IN. IS PERMISSIBLE OVER 1/4 OF THE PERIPHERY.

5 ADJUST CANOPY SHOES (20), INSTALLING WASHERS AS REQUIRED TO OBTAIN A .015 IN. CLEARANCE BETWEEN SHOES AND OUTER EDGE OF TRACKS. SEE DETAIL D. SHOES MUST NOT BIND.

6 ADJUST ROLLERS ON GEAR BOX WITH WASHERS SO THAT WHEN THE CANOPY IS OPEN 2 INS., MAXIMUM VERTICAL MOVEMENT OBTAINABLE AT AFT END OF CANOPY, IS 3/32 IN. CANOPY, OPENED ELECTRICALLY TO AFT LIMIT, MUST REST ON ROLLERS. CLEARANCE MUST EXIST BETWEEN RACK AND PINION.

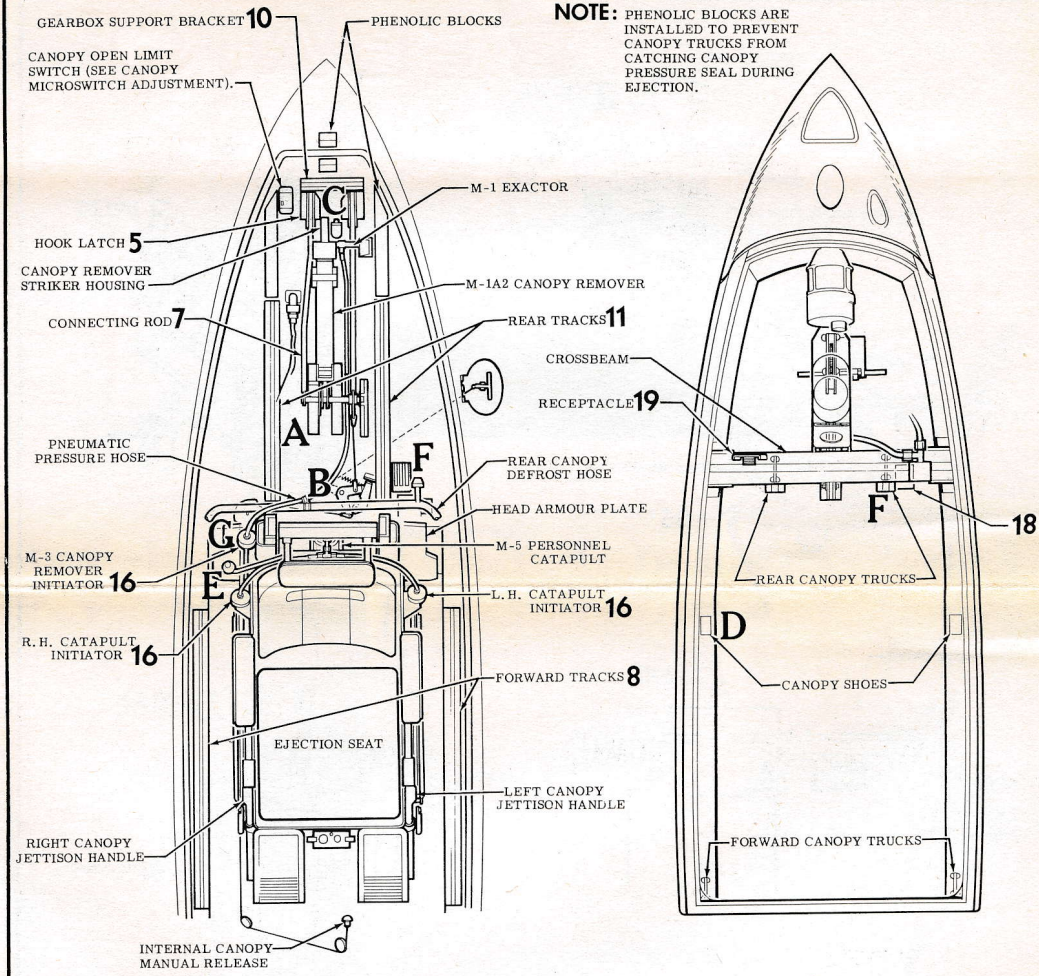
7 ADJUST REAR TRUCKS BY INSTALLING AS REQUIRED TO OBTAIN A SMOOTH FITTING OF GEAR BOX TRUNNIONS (9) INTO GROOVES ON LATCH BRACKETS (5). CLEARANCE BETWEEN TRUNNIONS AND LATCH GROOVE ENDS IS 1/32 IN. MAXIMUM.

NOTE:

TRUNNIONS MUST NOT CAUSE LOAD ON BRACKETS DURING TRAVEL. IF TRUNNIONS ARE NOT CENTRALIZED IN BRACKET GROOVES, THE FRICTION WILL CAUSE HIGH LOADS DURING ELECTRICAL OR MANUAL OPERATION.

8 SHIM GEAR BOX SUPPORT BRACKET (10) ATTACHMENT BOLTS INDIVIDUALLY TO OBTAIN EVEN SUPPORT UNDER CONTACT AREA OF GEAR BOX. SEAL BOLTS AND BRACKET WITH EC801.

5E2-02-85



NOTE: PHENOLIC BLOCKS ARE INSTALLED TO PREVENT CANOPY TRUCKS FROM CATCHING CANOPY PRESSURE SEAL DURING EJECTION.

STEPS:

9 ADJUST POSITION OF MOTOR BY INSTALLING WASHERS AS REQUIRED TO ALIGN MOTOR DRIVE (2) WITH GEAR BOX DRIVE (1). SEE DETAIL C.

10 CLOSE LATCHES BY SQUEEZING INDICATORS (4) TOGETHER. CHECK THAT CROSS SHAFT INDICATORS (6) ARE ALIGNED WHEN LATCHES (5) ARE CLOSED. OPERATE CANOPY MANUALLY AND ELECTRICALLY TO CHECK THAT CANOPY OPERATES SATISFACTORILY WITHOUT BINDING.

11 CLOSE CANOPY AND CHECK THAT CLEARANCE BETWEEN CANOPY SKIRT AND FUSELAGE DECK FRAME IS 1/16 (± 1/32) IN. SEE DETAIL D.

12 OPERATE CANOPY SLOWLY TO CHECK THAT FREEDOM OF MOVEMENT AND CLEARANCE FROM PRESSURE SEAL EXISTS. CHECK THAT ALL OPENINGS ON THE FUSELAGE DECK ARE SEALED WITH EC 801.

13 CONNECT ELECTRICAL QUICK-DISCONNECT (17) TO RECEPTACLE ON RIGHT SIDE OF (19) CANOPY CROSS BEAM. CHECK THAT CLEARANCE BETWEEN DISCONNECT BRUSH HOLDER (18) AND RADIO COMPASS LOOP DISCONNECT BASE IS .207 IN. MAXIMUM WITH CANOPY CLOSED. SEE DETAIL F.

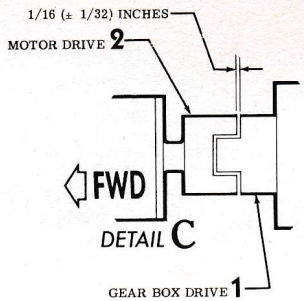
14 WHEN ACTUATING BELLCRANK (12) IS HELD AGAINST ITS STOP (13) BY SPRING (14) CANOPY SEAL DUMP SWITCH PLUNGER (15) MUST HAVE 1/16 IN. TRAVEL BEFORE IT BOTTOMS. SEE DETAIL E.

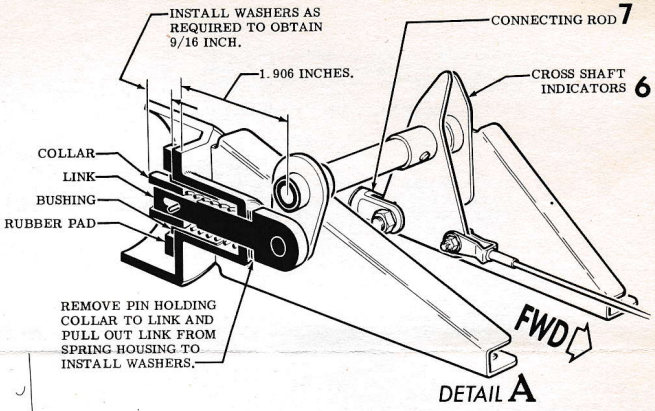
15 CHECK EJECTION SYSTEM, SEE TEXT.

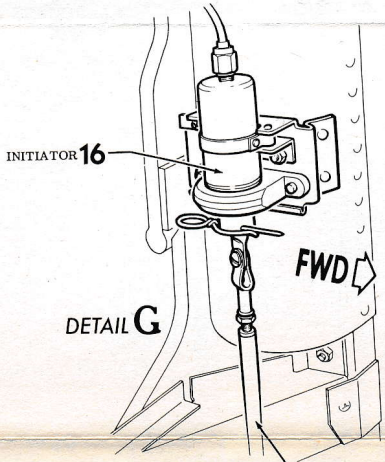
REINSTALLING CANOPY

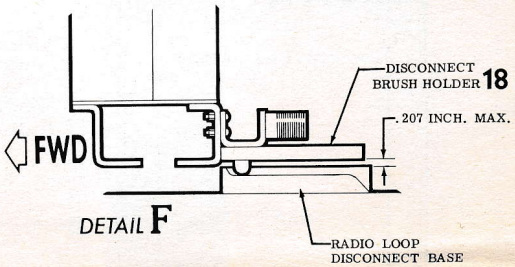
WHEN REINSTALLING A CANOPY, CHECK THAT GROUND SAFETY PIN IS INSTALLED IN ALL THREE INITIATORS. CARRY OUT STEPS 2, 3, 4, 10, 11, 12 AND 13.

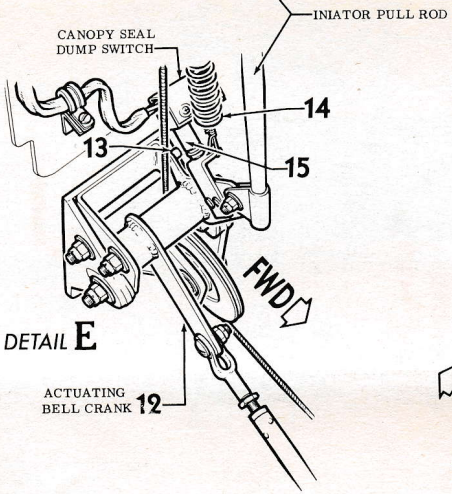
5E2-02-86

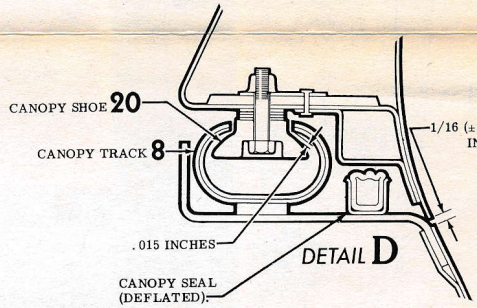

1/16 (± 1/32) INCHES
MOTOR DRIVE 2
FWD
DETAIL C
GEAR BOX DRIVE 1

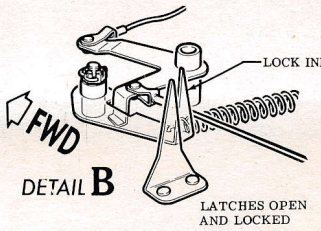

INSTALL WASHERS AS REQUIRED TO OBTAIN 9/16 INCH.
1.906 INCHES.
CONNECTING ROD 7
CROSS SHAFT INDICATORS 6
COLLAR
LINK
BUSHING
RUBBER PAD
REMOVE PIN HOLDING COLLAR TO LINK AND PULL OUT LINK FROM SPRING HOUSING TO INSTALL WASHERS.
FWD
DETAIL A


INITIATOR 16
FWD
DETAIL G

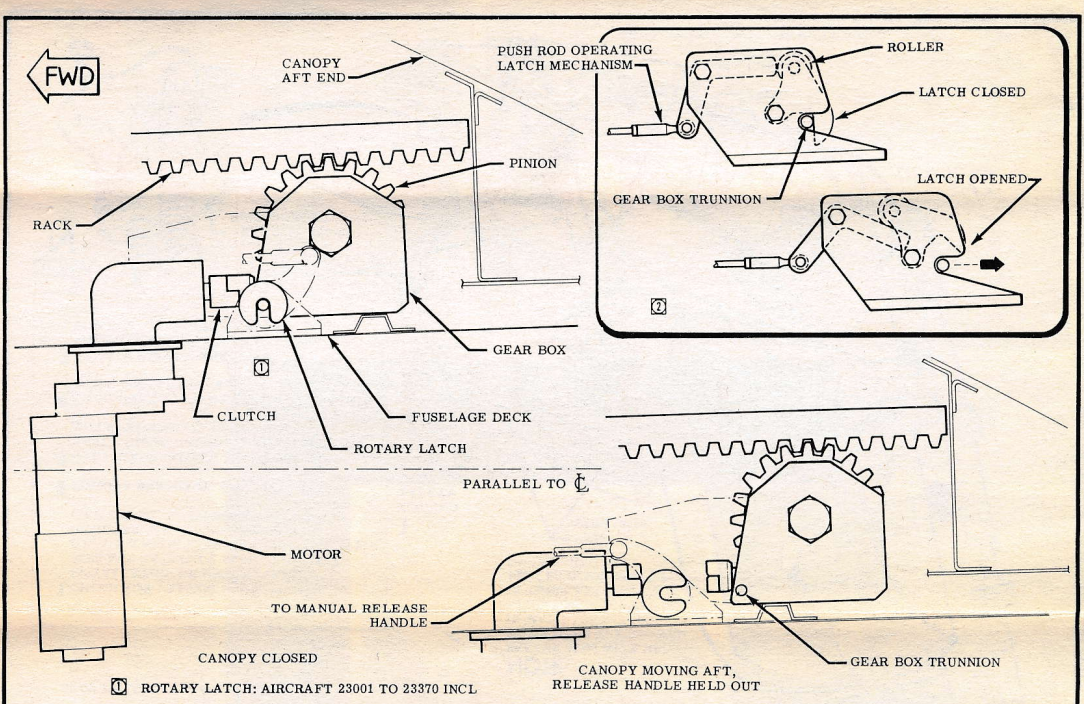

DISCONNECT BRUSH HOLDER 18
.207 INCH. MAX.
FWD
DETAIL F
RADIO LOOP DISCONNECT BASE

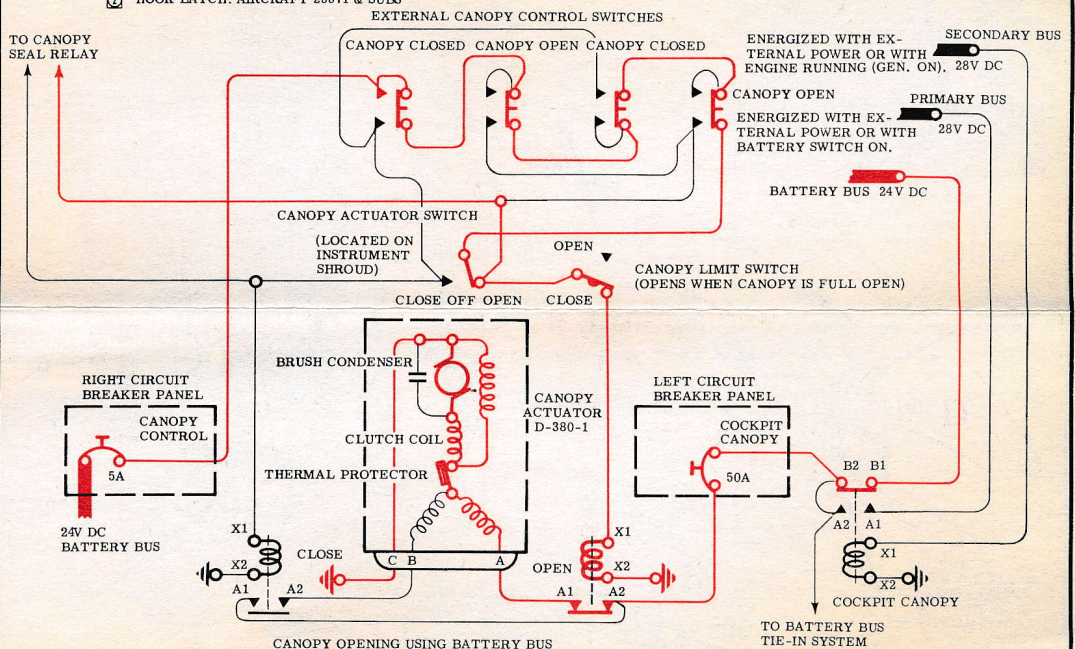

INIATOR PULL ROD
CANOPY SEAL DUMP SWITCH
14
13
15
FWD
DETAIL E
ACTUATING BELL CRANK 12

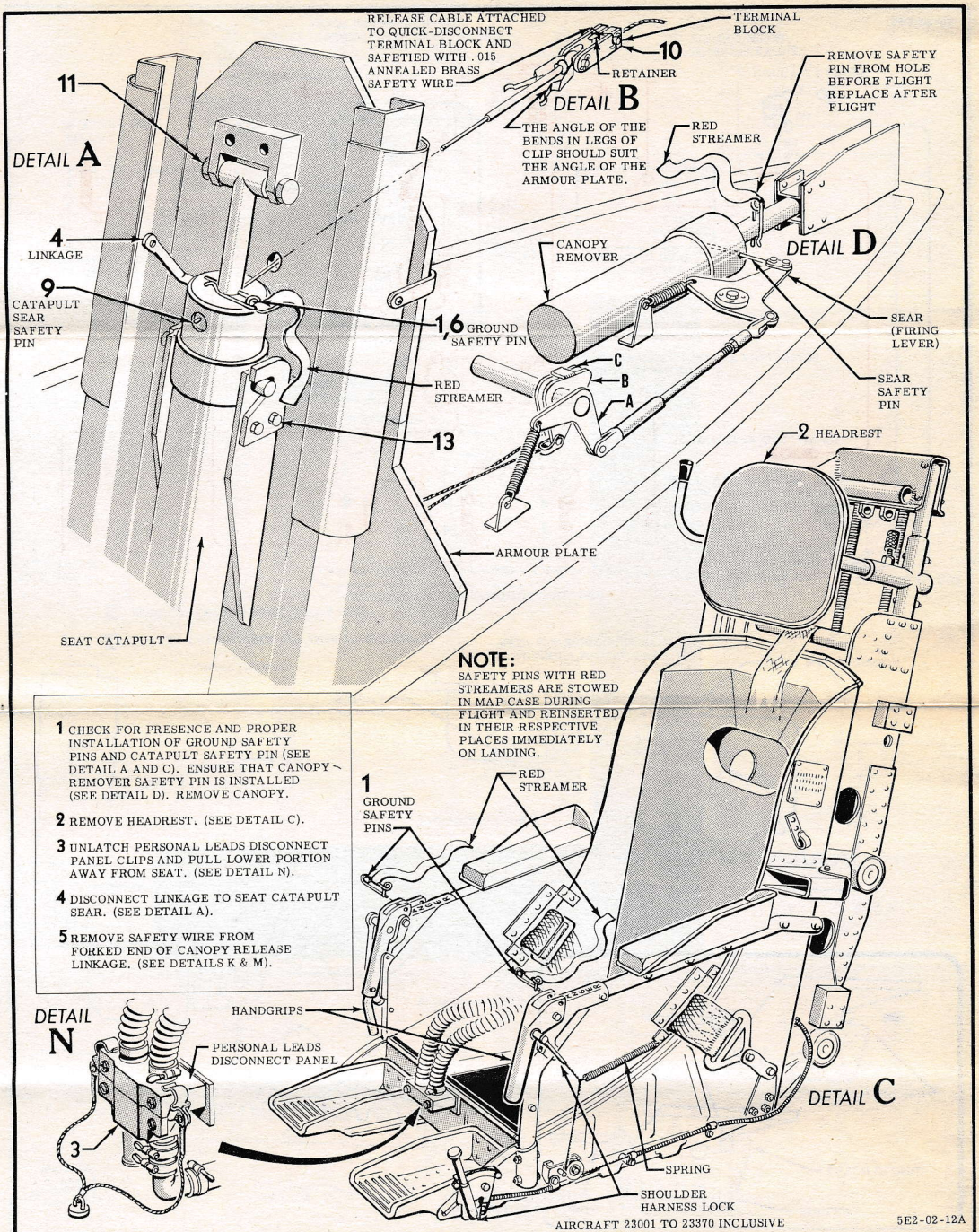

CANOPY SHOE 20
CANOPY TRACK 8
1/16 (± 1/32) INCHES
.015 INCHES
DETAIL D
CANOPY SEAL (DEFLATED)


LOCK INDICATORS 4
FWD
DETAIL B
LATCHES OPEN AND LOCKED

5E2-02-90


FWD
CANOPY AFT END
PUSH ROD OPERATING LATCH MECHANISM
ROLLER
LATCH CLOSED
LATCH OPENED
GEAR BOX TRUNNION
PINION
RACK
GEAR BOX
CLUTCH
FUSELAGE DECK
ROTARY LATCH
PARALLEL TO ℄
MOTOR
TO MANUAL RELEASE HANDLE
GEAR BOX TRUNNION
CANOPY CLOSED
CANOPY MOVING AFT, RELEASE HANDLE HELD OUT
[1] ROTARY LATCH: AIRCRAFT 23001 TO 23370 INCL
[2] HOOK LATCH: AIRCRAFT 23371 & SUBS

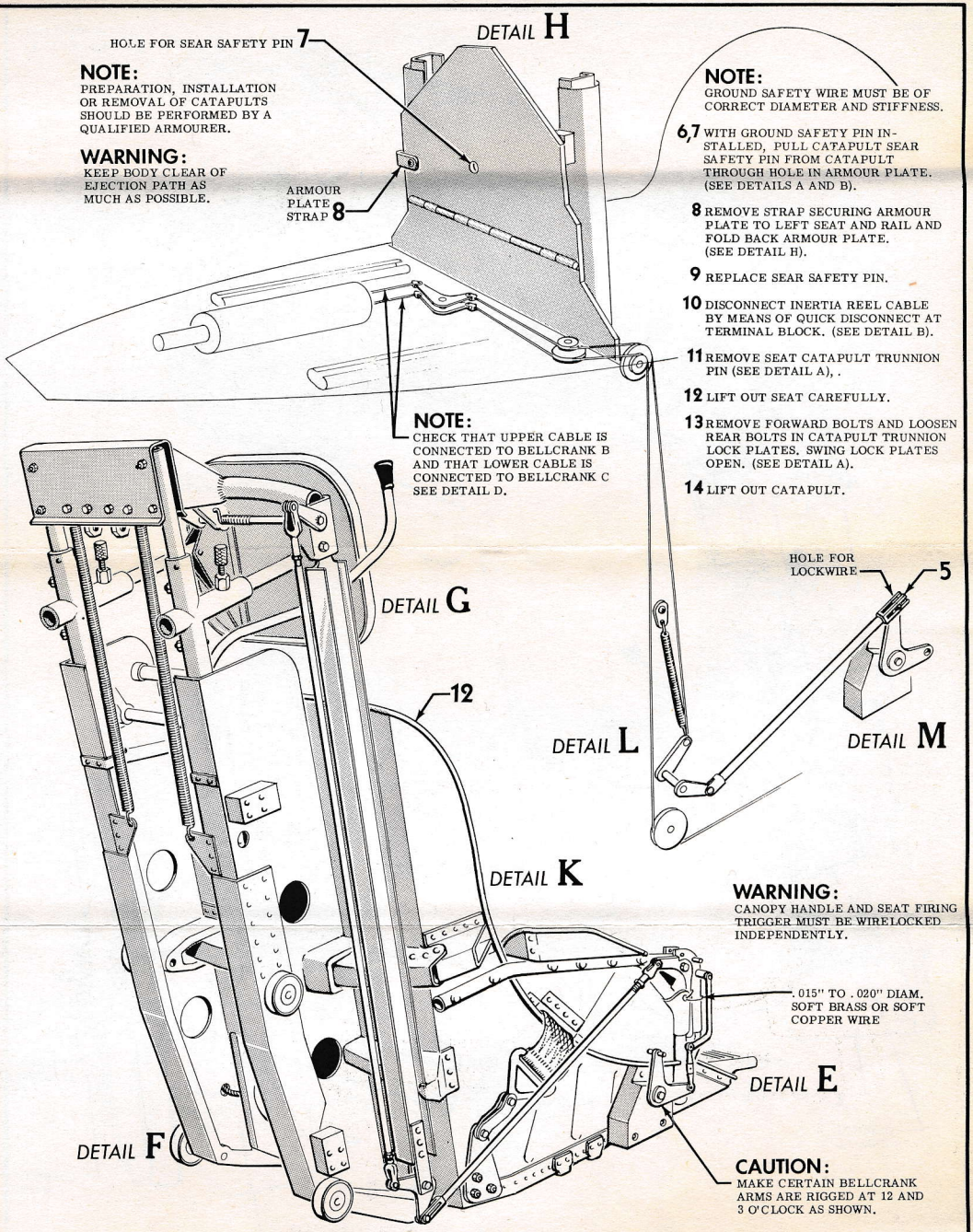

EXTERNAL CANOPY CONTROL SWITCHES
TO CANOPY SEAL RELAY
CANOPY CLOSED
CANOPY OPEN
CANOPY CLOSED
ENERGIZED WITH EXTERNAL POWER OR WITH ENGINE RUNNING (GEN. ON).
SECONDARY BUS
28V DC
CANOPY OPEN
PRIMARY BUS
ENERGIZED WITH EXTERNAL POWER OR WITH BATTERY SWITCH ON.
28V DC
BATTERY BUS 24V DC
CANOPY ACTUATOR SWITCH
(LOCATED ON INSTRUMENT SHROUD)
OPEN
CANOPY LIMIT SWITCH
(OPENS WHEN CANOPY IS FULL OPEN)
CLOSE OFF OPEN
CLOSE
BRUSH CONDENSER
CANOPY ACTUATOR D-380-1
CLUTCH COIL
THERMAL PROTECTOR
RIGHT CIRCUIT BREAKER PANEL
CANOPY CONTROL
5A
24V DC BATTERY BUS
LEFT CIRCUIT BREAKER PANEL
COCKPIT CANOPY
50A
B2 B1
A2 A1
X1
X2
A1
A2
CLOSE
OPEN
C B A
COCKPIT CANOPY
TO BATTERY BUS TIE-IN SYSTEM
CANOPY OPENING USING BATTERY BUS (BATTERY SWITCH OFF)
5E2-02-6A

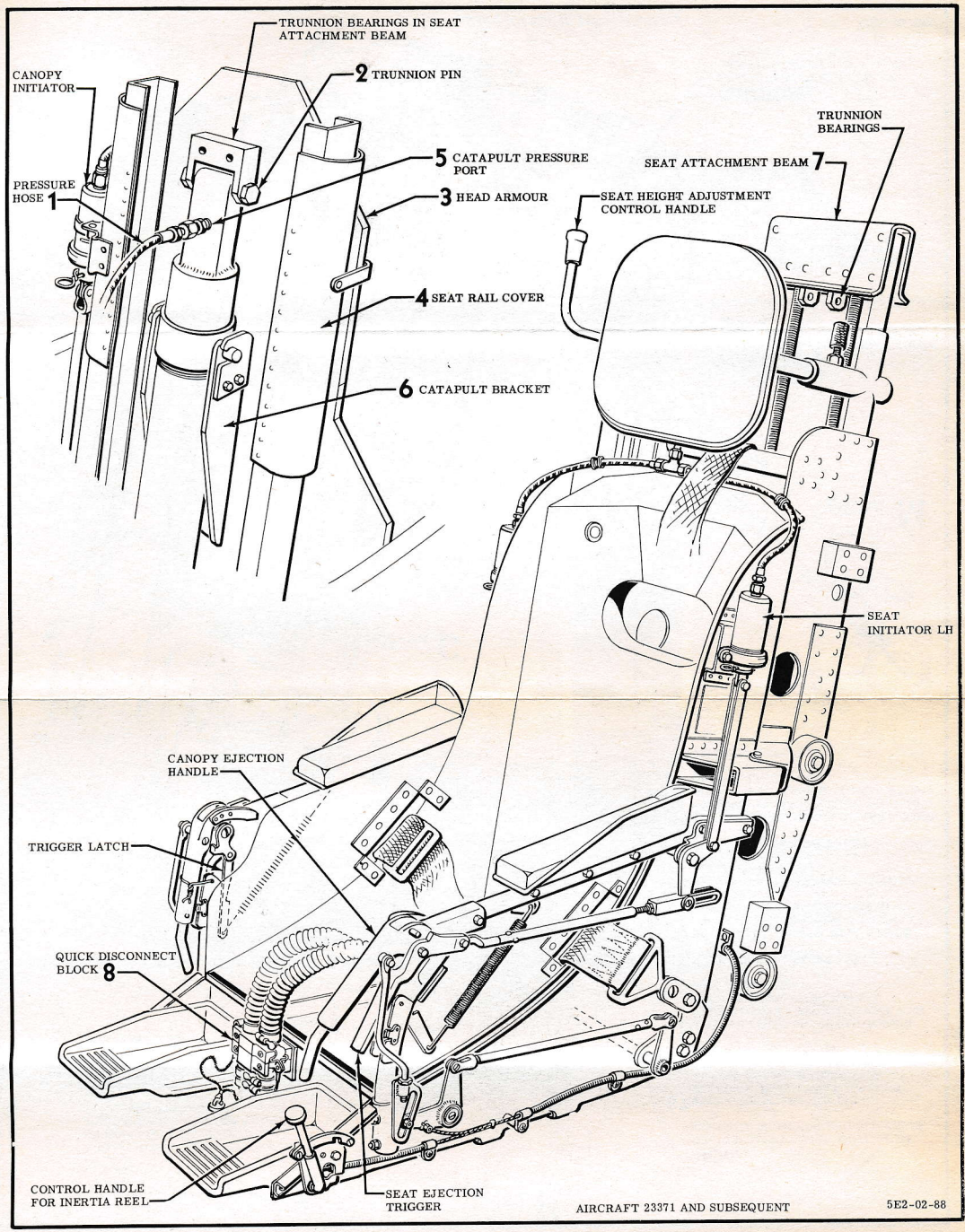

RELEASE CABLE ATTACHED TO QUICK-DISCONNECT TERMINAL BLOCK AND SAFETIED WITH .015 ANNEALED BRASS SAFETY WIRE
TERMINAL BLOCK
10
RETAINER
DETAIL B
REMOVE SAFETY PIN FROM HOLE BEFORE FLIGHT REPLACE AFTER FLIGHT
THE ANGLE OF THE BENDS IN LEGS OF CLIP SHOULD SUIT THE ANGLE OF THE ARMOUR PLATE.
RED STREAMER
11
DETAIL A
4
LINKAGE
9
CATAPULT SEAR SAFETY PIN
CANOPY REMOVER
DETAIL D
1,6 GROUND SAFETY PIN
SEAR (FIRING LEVER)
C
B
A
RED STREAMER
SEAR SAFETY PIN
13
2 HEADREST
ARMOUR PLATE
SEAT CATAPULT
NOTE:
SAFETY PINS WITH RED STREAMERS ARE STOWED IN MAP CASE DURING FLIGHT AND REINSERTED IN THEIR RESPECTIVE PLACES IMMEDIATELY ON LANDING.
1 CHECK FOR PRESENCE AND PROPER INSTALLATION OF GROUND SAFETY PINS AND CATAPULT SAFETY PIN (SEE DETAIL A AND C). ENSURE THAT CANOPY REMOVER SAFETY PIN IS INSTALLED (SEE DETAIL D). REMOVE CANOPY.
2 REMOVE HEADREST. (SEE DETAIL C).
3 UNLATCH PERSONAL LEADS DISCONNECT PANEL CLIPS AND PULL LOWER PORTION AWAY FROM SEAT. (SEE DETAIL N).
4 DISCONNECT LINKAGE TO SEAT CATAPULT SEAR. (SEE DETAIL A).
5 REMOVE SAFETY WIRE FROM FORKED END OF CANOPY RELEASE LINKAGE. (SEE DETAILS K & M).
1 GROUND SAFETY PINS
RED STREAMER
DETAIL N
HANDGRIPS
PERSONAL LEADS DISCONNECT PANEL
3
DETAIL C
SPRING
SHOULDER HARNESS LOCK
AIRCRAFT 23001 TO 23370 INCLUSIVE
5E2-02-12A

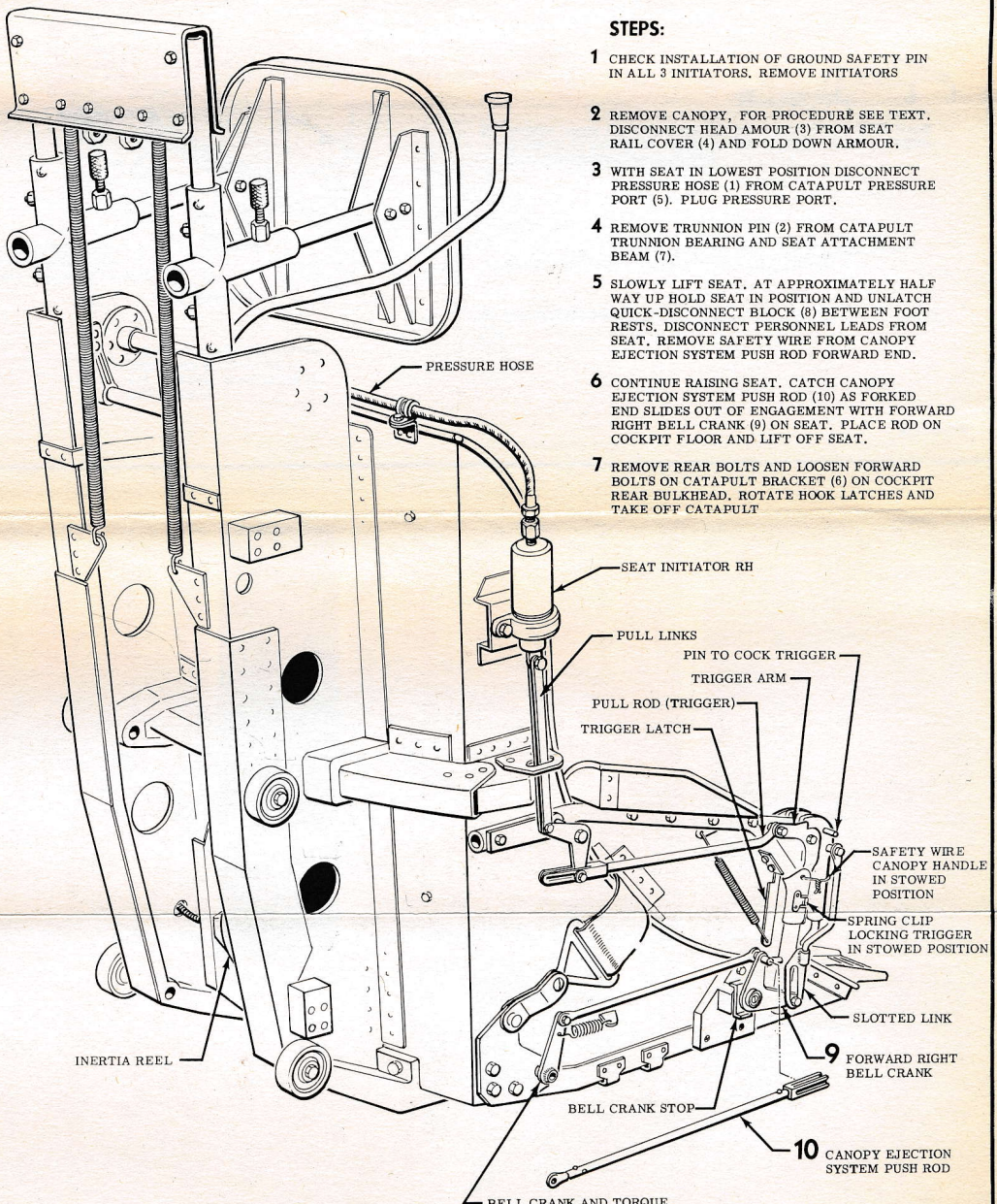
Removing Ejection Seat and Catapult

32

Sheet 1 of 4


DETAIL H
HOLE FOR SEAR SAFETY PIN 7
NOTE:
PREPARATION, INSTALLATION OR REMOVAL OF CATAPULTS SHOULD BE PERFORMED BY A QUALIFIED ARMOURER.
WARNING:
KEEP BODY CLEAR OF EJECTION PATH AS MUCH AS POSSIBLE.
ARMOUR PLATE STRAP 8
NOTE:
GROUND SAFETY WIRE MUST BE OF CORRECT DIAMETER AND STIFFNESS.
6,7 WITH GROUND SAFETY PIN INSTALLED, PULL CATAPULT SEAR SAFETY PIN FROM CATAPULT THROUGH HOLE IN ARMOUR PLATE. (SEE DETAILS A AND B).
8 REMOVE STRAP SECURING ARMOUR PLATE TO LEFT SEAT AND RAIL AND FOLD BACK ARMOUR PLATE. (SEE DETAIL H).
9 REPLACE SEAR SAFETY PIN.
10 DISCONNECT INERTIA REEL CABLE BY MEANS OF QUICK DISCONNECT AT TERMINAL BLOCK. (SEE DETAIL B).
11 REMOVE SEAT CATAPULT TRUNNION PIN (SEE DETAIL A), .
12 LIFT OUT SEAT CAREFULLY.
13 REMOVE FORWARD BOLTS AND LOOSEN REAR BOLTS IN CATAPULT TRUNNION LOCK PLATES. SWING LOCK PLATES OPEN. (SEE DETAIL A).
14 LIFT OUT CATAPULT.
NOTE:
CHECK THAT UPPER CABLE IS CONNECTED TO BELLCRANK B AND THAT LOWER CABLE IS CONNECTED TO BELLCRANK C SEE DETAIL D.
DETAIL G
12
HOLE FOR LOCKWIRE
5
DETAIL L
DETAIL M
DETAIL K
WARNING:
CANOPY HANDLE AND SEAT FIRING TRIGGER MUST BE WIRELOCKED INDEPENDENTLY.
.015" TO .020" DIAM. SOFT BRASS OR SOFT COPPER WIRE
DETAIL E
DETAIL F
CAUTION:
MAKE CERTAIN BELLCRANK ARMS ARE RIGGED AT 12 AND 3 O'CLOCK AS SHOWN.
AIRCRAFT 23001 TO 23370 INCLUSIVE
5E2-02-13A


TRUNNION BEARINGS IN SEAT ATTACHMENT BEAM
CANOPY INITIATOR
2 TRUNNION PIN
TRUNNION BEARINGS
5 CATAPULT PRESSURE PORT
SEAT ATTACHMENT BEAM 7
PRESSURE HOSE 1
3 HEAD ARMOUR
SEAT HEIGHT ADJUSTMENT CONTROL HANDLE
4 SEAT RAIL COVER
6 CATAPULT BRACKET
SEAT INITIATOR LH
CANOPY EJECTION HANDLE
TRIGGER LATCH
QUICK DISCONNECT BLOCK 8
CONTROL HANDLE FOR INERTIA REEL
SEAT EJECTION TRIGGER
AIRCRAFT 23371 AND SUBSEQUENT
5E2-02-88


PRESSURE HOSE
SEAT INITIATOR RH
PULL LINKS
PIN TO COCK TRIGGER
TRIGGER ARM
PULL ROD (TRIGGER)
TRIGGER LATCH
SAFETY WIRE CANOPY HANDLE IN STOWED POSITION
SPRING CLIP LOCKING TRIGGER IN STOWED POSITION
SLOTTED LINK
9 FORWARD RIGHT BELL CRANK
BELL CRANK STOP
10 CANOPY EJECTION SYSTEM PUSH ROD
INERTIA REEL
BELL CRANK AND TORQUE TUBE INTERCONNECTING RIGHT AND LEFT CANOPY HANDLE.

STEPS:

1 CHECK INSTALLATION OF GROUND SAFETY PIN IN ALL 3 INITIATORS. REMOVE INITIATORS

2 REMOVE CANOPY, FOR PROCEDURE SEE TEXT. DISCONNECT HEAD AMOUR (3) FROM SEAT RAIL COVER (4) AND FOLD DOWN ARMOUR.

3 WITH SEAT IN LOWEST POSITION DISCONNECT PRESSURE HOSE (1) FROM CATAPULT PRESSURE PORT (5). PLUG PRESSURE PORT.

4 REMOVE TRUNNION PIN (2) FROM CATAPULT TRUNNION BEARING AND SEAT ATTACHMENT BEAM (7).

5 SLOWLY LIFT SEAT. AT APPROXIMATELY HALF WAY UP HOLD SEAT IN POSITION AND UNLATCH QUICK-DISCONNECT BLOCK (8) BETWEEN FOOT RESTS. DISCONNECT PERSONNEL LEADS FROM SEAT. REMOVE SAFETY WIRE FROM CANOPY EJECTION SYSTEM PUSH ROD FORWARD END.

6 CONTINUE RAISING SEAT. CATCH CANOPY EJECTION SYSTEM PUSH ROD (10) AS FORKED END SLIDES OUT OF ENGAGEMENT WITH FORWARD RIGHT BELL CRANK (9) ON SEAT. PLACE ROD ON COCKPIT FLOOR AND LIFT OFF SEAT.

7 REMOVE REAR BOLTS AND LOOSEN FORWARD BOLTS ON CATAPULT BRACKET (6) ON COCKPIT REAR BULKHEAD. ROTATE HOOK LATCHES AND TAKE OFF CATAPULT

AIRCRAFT 23371 AND SUBSEQUENT

5E2-02-89

DISASSEMBLING HARNESS RELEASE MECHANISM

NOTE:
TO CLEAN AND LUBRICATE RELEASE MECHANISM TO SPECIFICATION IT IS NECESSARY TO DISASSEMBLE RACK FROM UNIT. IF UNIT IS LOADED, CARTRIDGES MUST BE REMOVED AND HAMMER AND RACK RELEASED. ARMING WIRE MUST BE REMOVED.

1 REMOVE TOP PLATE (12). REMOVE MAIN WHEEL (13), SECOND WHEEL (9), THIRD WHEEL (10), AND PALLET (8).

2 INVERT UNIT TO ALLOW RACK PLUNGER TO FALL OUT OF RACK HOUSING (5).

3 REMOVE BARREL BY UNSCREWING THREE SCREWS. DISCONNECT SPRING (16) FROM BELLCRANK (6).

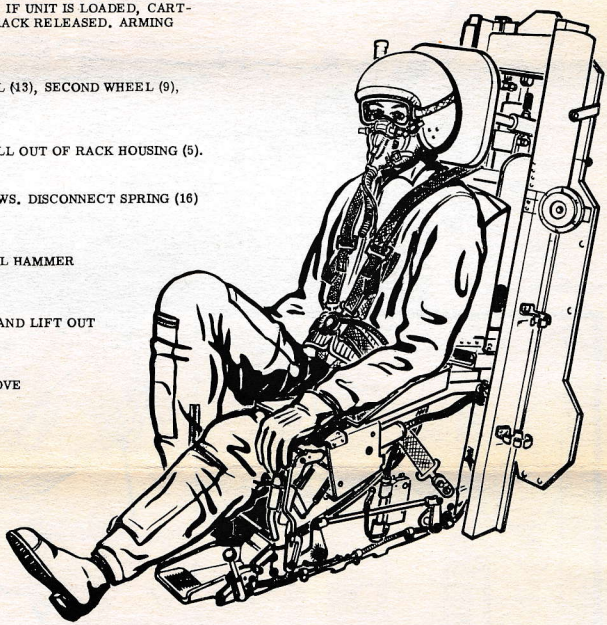
4 REMOVE BREECH BLOCK (14) AND DIFFERENTIAL HAMMER ASSEMBLY (15).

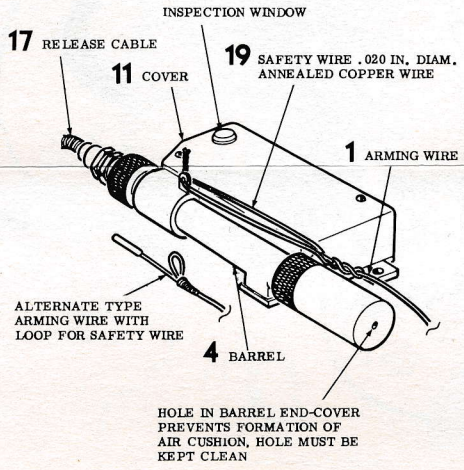
5 ROTATE BELLCRANK TO CLEAR RACK HOUSING AND LIFT OUT BELLCRANK.

6 REMOVE FOUR ATTACHMENT SCREWS AND REMOVE RACK HOUSING FROM BASE PLATE.

7 UNSCREW THREE SCREWS SECURING RACK END PLATE TO RACK HOUSING. REMOVE END PLATE AND RACK.

NOTE:
TO REASSEMBLE UNIT, REVERSE ABOVE PROCEDURE. SEE THAT BELLCRANK LINK (7) IS IN RIGHT POSITION WHEN INSTALLING, OTHERWISE HAMMER CANNOT BE HELD IN COCKED POSITION.




INSPECTION WINDOW
17 RELEASE CABLE
11 COVER
19 SAFETY WIRE .020 IN. DIAM. ANNEALED COPPER WIRE
1 ARMING WIRE
ALTERNATE TYPE ARMING WIRE WITH LOOP FOR SAFETY WIRE
4 BARREL
HOLE IN BARREL END-COVER PREVENTS FORMATION OF AIR CUSHION, HOLE MUST BE KEPT CLEAN

CHARGING HARNESS RELEASE MECHANISM

1 WITH RELEASE MECHANISM ON TEST BENCH. REMOVE COVER.

2 PLACE END SPIGOT ON HAMMER COCKING TOOL (2) IN HOLE IN UPPER HAMMER. TURN HAMMER ASSEMBLY APPROXIMATELY 100^{0} AGAINST ACTION OF SPRING (16). TURN COCKING TOOL SO THAT INNER SPIGOT RESTS AGAINST EDGE OF TOP PLATE (12).

3 INSERT RACK KEY THROUGH LOWER OPENING AND PUSH RACK IN UNTIL IT BOTTOMS. PUSH IN ARMING WIRE AS FAR AS POSSIBLE AND WITHDRAW RACK KEY.

NOTE:
INSPECT THROUGH RED MARKED HOLE IN TOP PLATE THAT ARMING WIRE END CROSSES HOLE COMPLETELY.

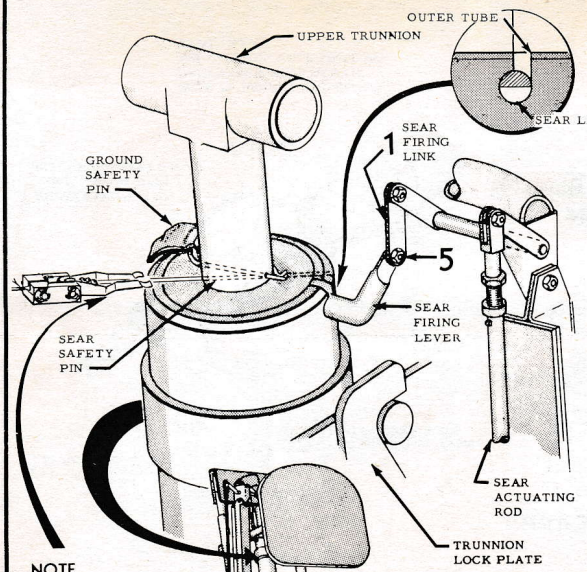
4 CONTINUE WITH STEPS 6, 7 AND 8 FROM CLEANING PROCEDURE.

5E2-02-108

Adjusting Seat Emergency Release Mechanism 36B

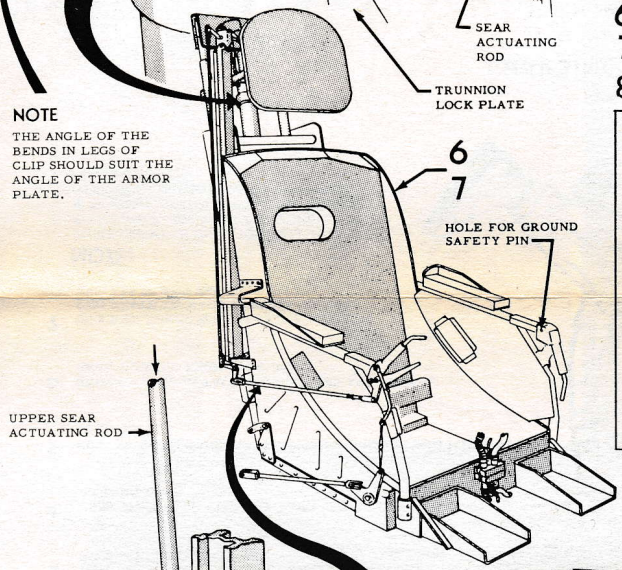
Sheet 1 of 2

Revised July 56



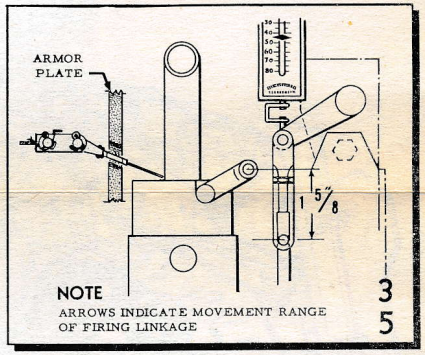
NOTE

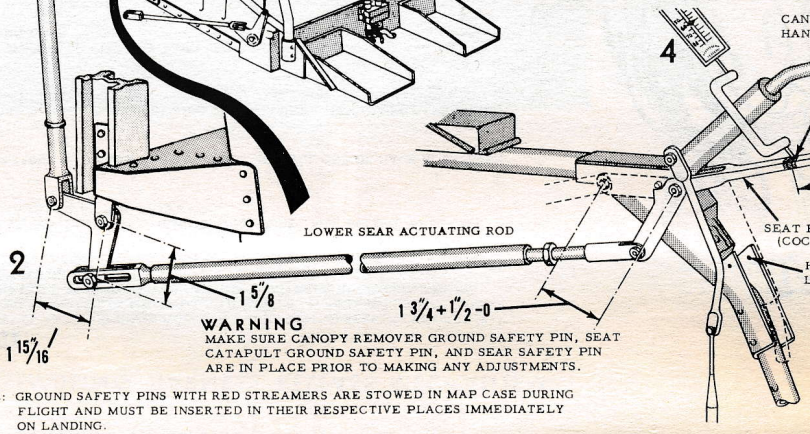
THE ANGLE OF THE BENDS IN LEGS OF CLIP SHOULD SUIT THE ANGLE OF THE ARMOR PLATE.



WARNING: BE SURE CANOPY REMOVER LINKAGE IS NOT CONNECTED.

1. WITH SEAR FIRING LINK DISCONNECTED FROM SEAR FIRING LEVER AND SEAT IN UPPERMOST POSITION, ROTATE LOWER BELL CRANK TO FULL UP POSITION AND ADJUST UPPER ROD END TO ALIGN HOLES IN SEAR FIRING LEVER AND SEAR FIRING LINK.
2. WITH SEAT FIRING TRIGGER IN COCKED POSITION, ADJUST LOWER ROD SO THAT THE PIN IN LOWER BELL CRANK IS AT THE END OF TRAVEL OF SLOT IN LOWER ROD END, BUT IS WITHOUT STRAIN.
3. ATTACH A 50-POUND CAPACITY SPRING (SUSPENDED-TYPE) SCALE TO SEAR ACTUATING ROD ARM, AND SUBJECT LINKAGE TO A 45-POUND PULL.
4. WRAP ADHESIVE TAPE AROUND TRIGGER TO PREVENT SCALE FROM SLIPPING; THEN APPLY A SUITABLE SPRING SCALE, 1-5/8 INCHES FROM TIP OF SEAT FIRING TRIGGER. WHILE WATCHING THIS SCALE AND APPLYING ITS FORCE AT A CONSTANT RIGHT ANGLE TO THE GRIP SURFACE, INCREASE THE FORCE AND PULL THE TRIGGER UNTIL THIS SCALE READS 60 POUNDS.
5. WHILE HOLDING BOTH LOADS, MEASURE THE DISTANCE (PARALLEL TO LINE OF EJECTION) THROUGH WHICH THE LINK ATTACHING BOLT HAS MOVED. THIS DISTANCE MUST BE AT LEAST 1-5/8 INCHES.
6. PLACE SEAT IN MIDDLE POSITION AND REPEAT.
7. PLACE SEAT IN BOTTOMMOST POSITION AND REPEAT STEPS 3, 4 AND 5.
8. REMOVE ADHESIVE TAPE FROM TRIGGER.





WARNING

MAKE SURE CANOPY REMOVER GROUND SAFETY PIN, SEAT CATAPULT GROUND SAFETY PIN, AND SEAR SAFETY PIN ARE IN PLACE PRIOR TO MAKING ANY ADJUSTMENTS.

NOTE: GROUND SAFETY PINS WITH RED STREAMERS ARE STOWED IN MAP CASE DURING FLIGHT AND MUST BE INSERTED IN THEIR RESPECTIVE PLACES IMMEDIATELY ON LANDING.

5E2-02-14A

STEPS:

1 REMOVE THREE GAS INITIATORS

2 RAISE RIGHT CANOPY HANDLE (1). CHECK THAT TRIGGER (2) REMAINS IN STOWED POSITION DURING INITIAL 60° TRAVEL, HELD BY SPRING CLIPS (3). RETURN HANDLE TO STOWED POSITION; THEN RAISE HANDLE AND TRIGGER TOGETHER. CHECK THAT IT IS IMPOSSIBLE TO RAISE HANDLE AND TRIGGER SIMULTANEOUSLY BEYOND 60° TRAVEL.

3 RELEASE TRIGGER AND LOCK HANDLE IN UPPER LIMIT. CHECK THAT LATCH (4) RELEASES TRIGGER APPROXIMATELY 1/2 INCH BEFORE HANDLE LOCKS. STOW RIGHT HANDLE AND TRIGGER. REPEAT FOR LEFT HANDLE AND TRIGGER.

4 ADJUST BENT ROD (5) BELOW HANDLES SO THAT 5/32 INCH OF THREAD IS EXPOSED (SEE DETAIL A). LOCK SHOULDER HARNESS USING LOCK HANDLE (7) (SEE DETAIL D). RAISE EITHER HANDLE (1) AND ADJUST CABLE (6) ATTACHED TO LEFT FORWARD BELL CRANK (8). ALL SLACK MUST BE REMOVED WHEN HANDLE (1) IS 1/4 INCH FROM UPPER LIMIT.

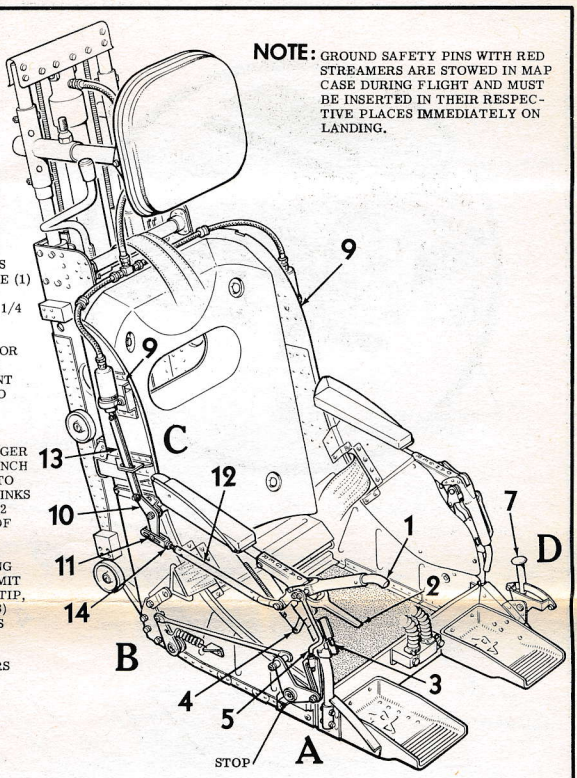
5 INSTALL RIG CLIP (SEE DETAIL C) ON BOTH CATAPULT INITIATOR BRACKETS (9). LOCK RIGHT HANDLE (1) IN UPPER LIMIT. CHECK THAT COCKING TRIGGER (2) DOES NOT PRODUCE ANY MOVEMENT OF BELL CRANK (10). PIN (11) CONNECTING BELL CRANK (10) TO PUSH ROD (12) MUST NOT BE PRELOADED. STOW HANDLE AND REPEAT WITH LEFT HANDLE

6 DISCONNECT FIRING LINKS (13) FROM RIG CLIPS. SQUEEZE TRIGGER (2). ADJUST FORK END (14) OF PUSH ROD (12) TO OBTAIN 13/16 INCH MINIMUM TRAVEL OF LINKS (13), MEASURED FROM HOLE NO. 1 TO NO. 2 ON RIG CLIP. STOW HANDLES AND TRIGGERS. CONNECT LINKS (13) TO HOLE NO. 1 ON RIG CLIP AND CHECK THAT THERE IS 1/32 INCH TO 1/8 INCH BETWEEN BOTTOM OF FORK (14) AND FACE OF BELL CRANK (10), (SEE DETAIL C).

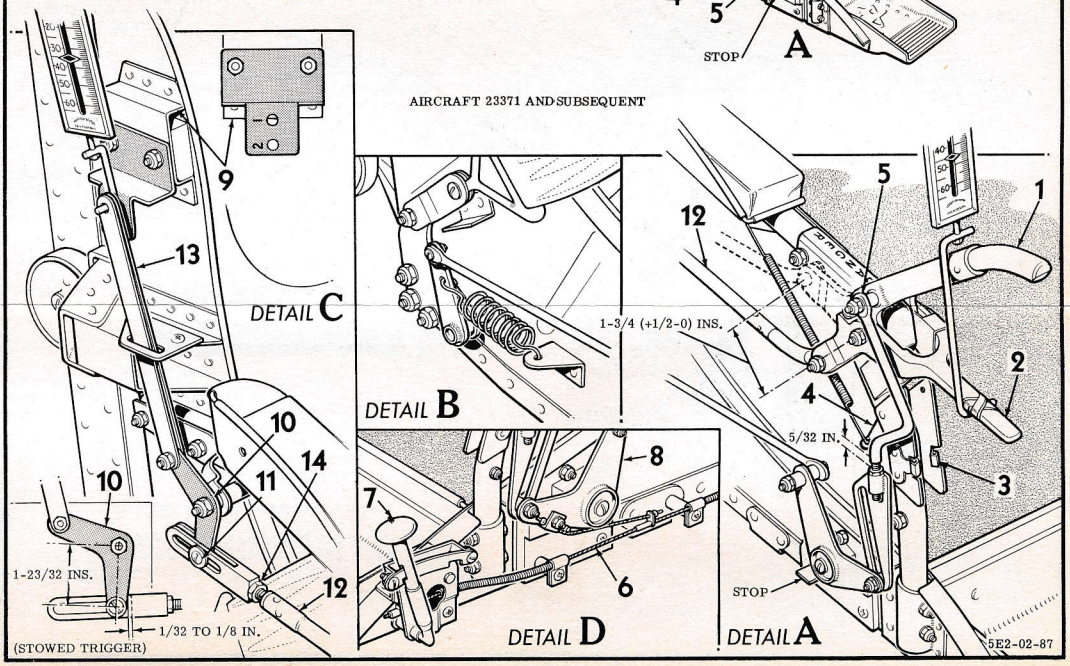
7 DISCONNECT LINKS (13) FROM RIG CLIPS AND ATTACH TO SPRING SCALES, (SEE DETAIL C). LOCK RIGHT HANDLE (1) IN UPPER LIMIT AND ATTACH SPRING SCALE TO TRIGGER (2), 1 1/2 INCH FROM TIP, (SEE DETAIL A). APPLY 35 POUNDS UPWARD LOAD TO LINKS (13) AND CHECK THAT LOAD REQUIRED ON TRIGGER TO MOVE LINKS 13/16 INCH IS 45 POUNDS MAXIMUM.

8 REMOVE RIG CLIPS AND SPRING SCALES. REINSTALL INITIATORS

NOTE: GROUND SAFETY PINS WITH RED STREAMERS ARE STOWED IN MAP CASE DURING FLIGHT AND MUST BE INSERTED IN THEIR RESPECTIVE PLACES IMMEDIATELY ON LANDING.



AIRCRAFT 23371 AND SUBSEQUENT

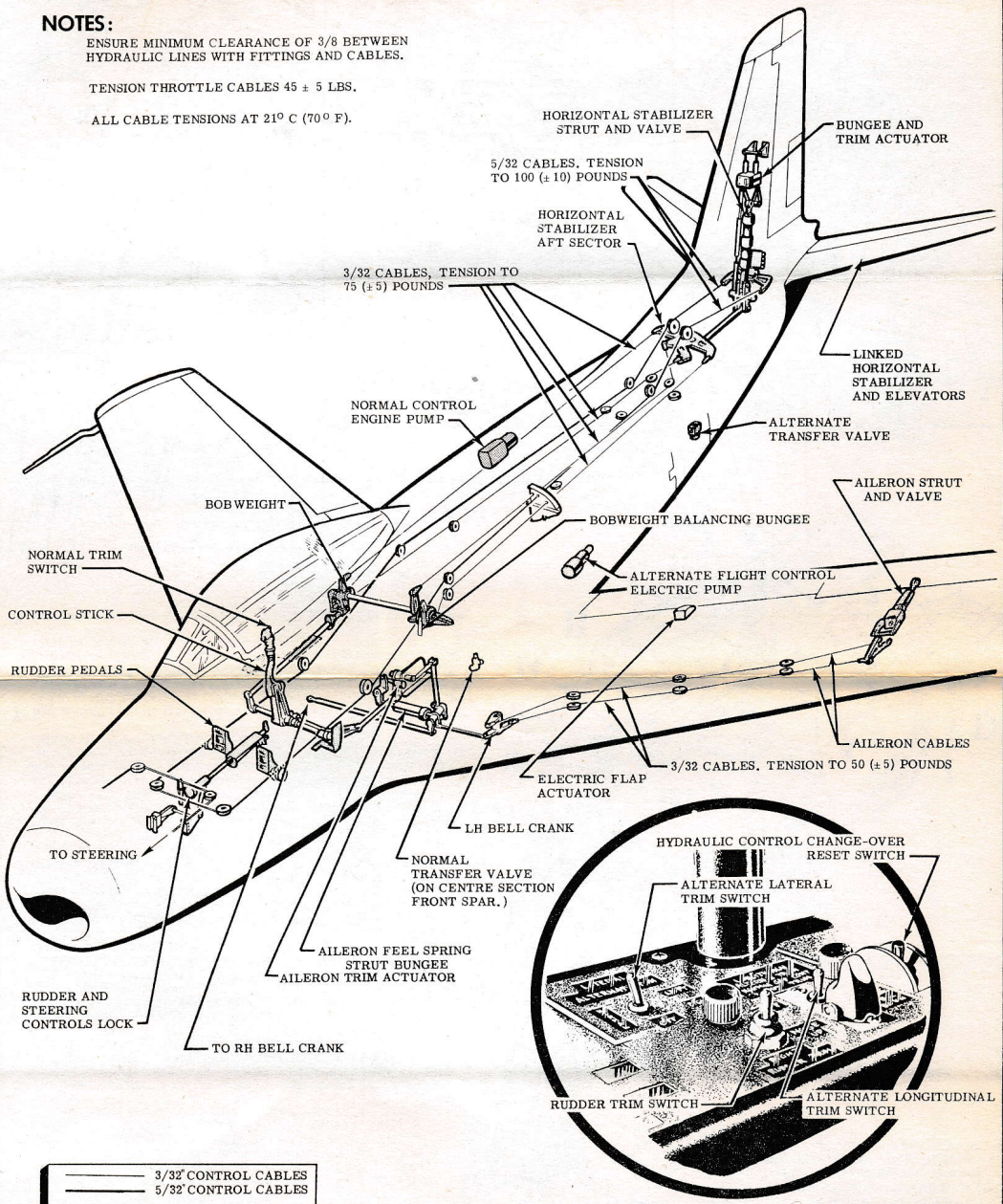


NOTES:

ENSURE MINIMUM CLEARANCE OF 3/8 BETWEEN HYDRAULIC LINES WITH FITTINGS AND CABLES.

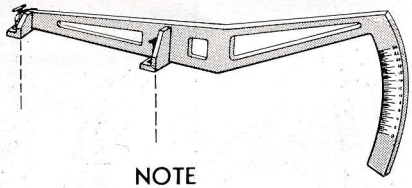
TENSION THROTTLE CABLES 45 ± 5 LBS.

ALL CABLE TENSIONS AT 21° C (70° F).

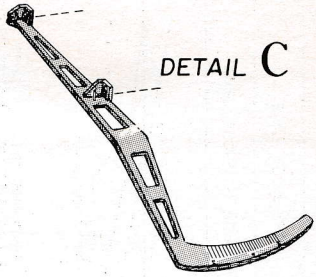

HORIZONTAL STABILIZER STRUT AND VALVE
BUNGEE AND TRIM ACTUATOR
5/32 CABLES. TENSION TO 100 (± 10) POUNDS
HORIZONTAL STABILIZER AFT SECTOR
3/32 CABLES, TENSION TO 75 (± 5) POUNDS
LINKED HORIZONTAL STABILIZER AND ELEVATORS
NORMAL CONTROL ENGINE PUMP
ALTERNATE TRANSFER VALVE
AILERON STRUT AND VALVE
BOB WEIGHT
BOBWEIGHT BALANCING BUNGEE
NORMAL TRIM SWITCH
ALTERNATE FLIGHT CONTROL ELECTRIC PUMP
CONTROL STICK
RUDDER PEDALS
AILERON CABLES
3/32 CABLES. TENSION TO 50 (± 5) POUNDS
ELECTRIC FLAP ACTUATOR
LH BELL CRANK
TO STEERING
NORMAL TRANSFER VALVE (ON CENTRE SECTION FRONT SPAR.)
HYDRAULIC CONTROL CHANGE-OVER RESET SWITCH
ALTERNATE LATERAL TRIM SWITCH
AILERON FEEL SPRING STRUT BUNGEE
AILERON TRIM ACTUATOR
RUDDER AND STEERING CONTROLS LOCK
TO RH BELL CRANK
RUDDER TRIM SWITCH
ALTERNATE LONGITUDINAL TRIM SWITCH
3/32" CONTROL CABLES
5/32" CONTROL CABLES

5E2-02-26

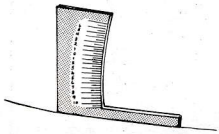
DETAIL A



DETAIL C

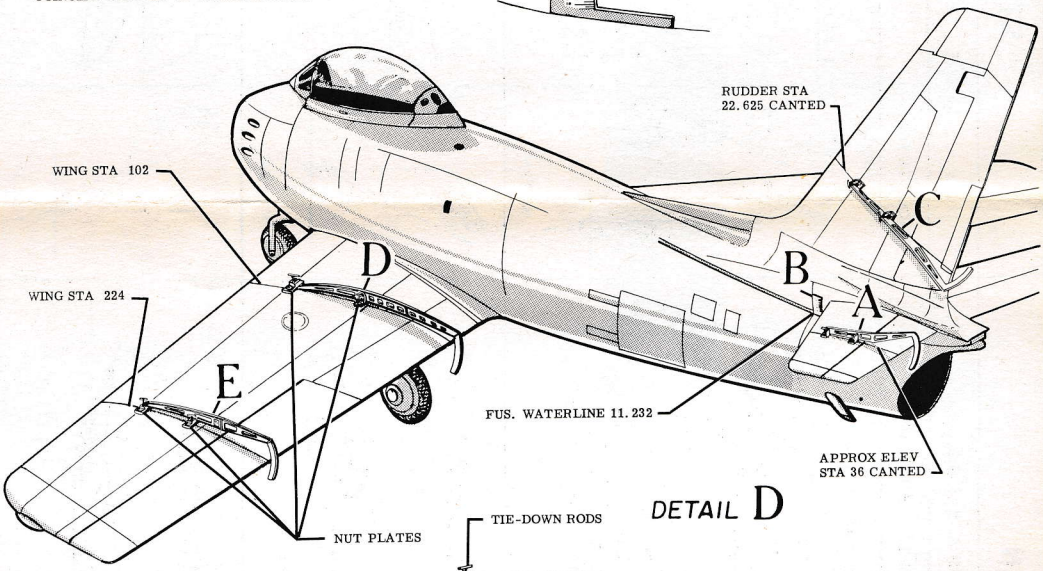


DETAIL B

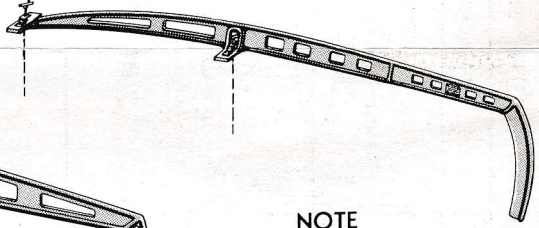


NOTE

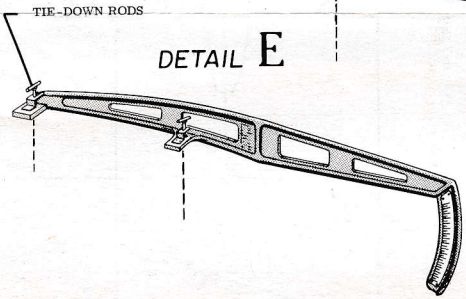
PROTRACTOR SCRIBE MARKS ARE DESIGNED TO COINCIDE WITH CENTER LINE OF CONTROL SURFACES. TO ENSURE MAXIMUM ACCURACY OF PROTRACTOR READINGS, LAY STRAIGHT EDGE ON THE SCRIBE LINE TO COINCIDE WITH TIP OF TRAILING EDGE.



DETAIL D



DETAIL E



NOTE

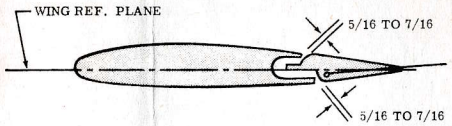
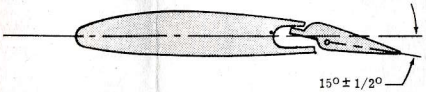
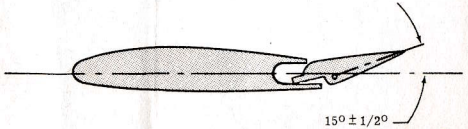
WHEN INSTALLING FIXTURES, REMOVE THE TWO PHILLIPS HEAD SCREWS FROM AIRCRAFT SURFACES AT THE RESPECTIVE STATIONS. ATTACH FIXTURES AND TIGHTEN TIE-DOWN RODS ON NUT PLATES.

5E2-02-36

5E2-02-83

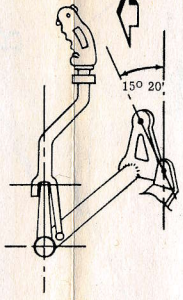
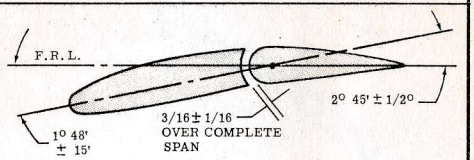
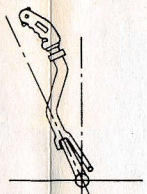
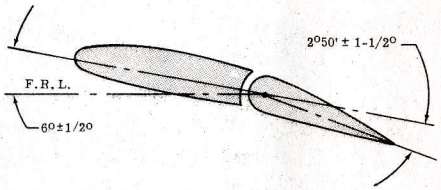
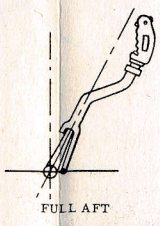
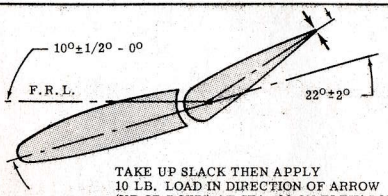
AILERON

CABLE TENSION 50 ± 5 LBS.

STICK POSITION LOOKING FORWARD	SURFACE POSITION
	BOTH AILERONS NEUTRAL  MAX. PERMISSIBLE FREE PLAY AT T/E 3/32 INCH. AILERON MUST RETURN TO NEUTRAL WITHIN 1/4° AILERON - FLAP MISALICNMENT 5/6 ± 1/16 INCH (WITH AILERONS NEUTRAL & FLAPS UP) FOR ANY OTHER CONDITION GAP 1/4 INCH MAX.
LEFT BANK 	RIGHT HAND AILERON SHOWN LEFT HAND OPPOSITE (UP) 
RIGHT BANK 	RIGHT HAND AILERON SHOWN LEFT HAND OPPOSITE (DOWN) 

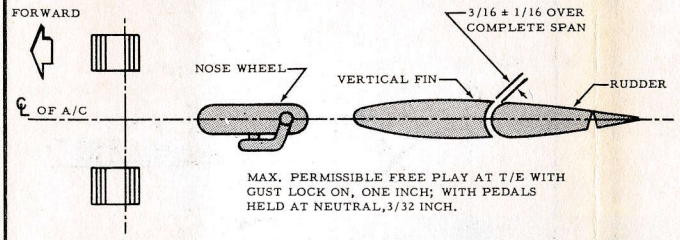
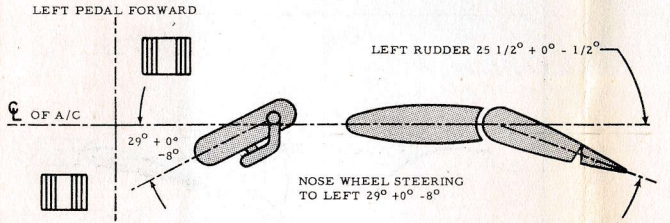
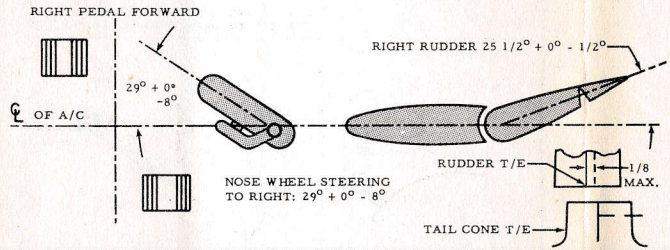
STABILIZER

CABLE TENSION 75 ± 7 LBS.

STICK POSITION	SURFACE POSITION
FORWARD  NEUTRAL	 MAX. PERMISSIBLE MISALIGNMENT BETWEEN LEFT AND RIGHT ELEVATORS IS 3/16 INCH MEASURED AT INBOARD T/E WITH STAB IN NEUTRAL. STAB. MUST RETURN TO NEUTRAL WITH 1/4° STAB MOVEMENT WHEN CHANGING FROM NORMAL TO ALTERNATE OR VICE-VERSA MUST NOT EXCEED 1/32 INCH MAX. PERMISSIBLE FREE PLAY AT T/E 3/32 FREE PLAY INTER-ELEVATORS 1/16 INCH MAX. AT INB'D T/E
 FULL FWD	
 FULL AFT	 TAKE UP SLACK THEN APPLY 10 LB. LOAD IN DIRECTION OF ARROW (UP OR DOWN) AT STA. 36 ON ELEVATOR. ADDITIONAL MOVEMENT DUE TO 10 LB. LOAD SHOULD NOT EXCEED 3/32 INCH.

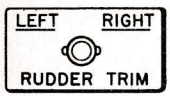
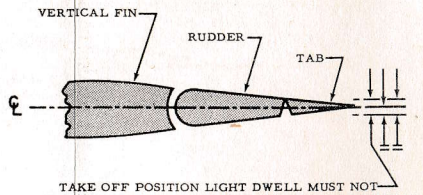
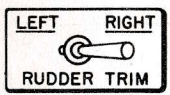
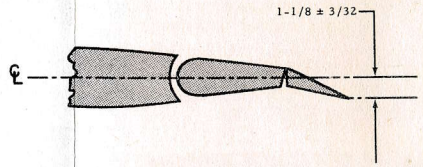
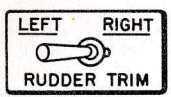
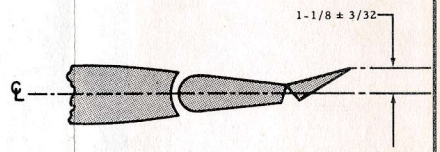
Control Surface Travels
Sheet 1 of 2

RUDDER TRAVELS

POSITION OF RUDDER PEDALS	SURFACE POSITION
FORWARD	
LEFT PEDAL FORWARD	
RIGHT PEDAL FORWARD	

FORWARD
3/16 ± 1/16 OVER COMPLETE SPAN
NOSE WHEEL
VERTICAL FIN
RUDDER
℄ OF A/C
MAX. PERMISSIBLE FREE PLAY AT T/E WITH GUST LOCK ON, ONE INCH; WITH PEDALS HELD AT NEUTRAL, 3/32 INCH.
LEFT PEDAL FORWARD
LEFT RUDDER 25 1/2° + 0° - 1/2°
℄ OF A/C
29° + 0° -8°
NOSE WHEEL STEERING TO LEFT 29° +0° -8°
RIGHT PEDAL FORWARD
RIGHT RUDDER 25 1/2° + 0° - 1/2°
29° + 0° -8°
℄ OF A/C
RUDDER T/E
1/8 MAX.
NOSE WHEEL STEERING TO RIGHT: 29° + 0° - 8°
TAIL CONE T/E

RUDDER TRIM TAB TRAVELS

SWITCH POSITION	POSITION OF TAB
	
	
	

5E2-02-84

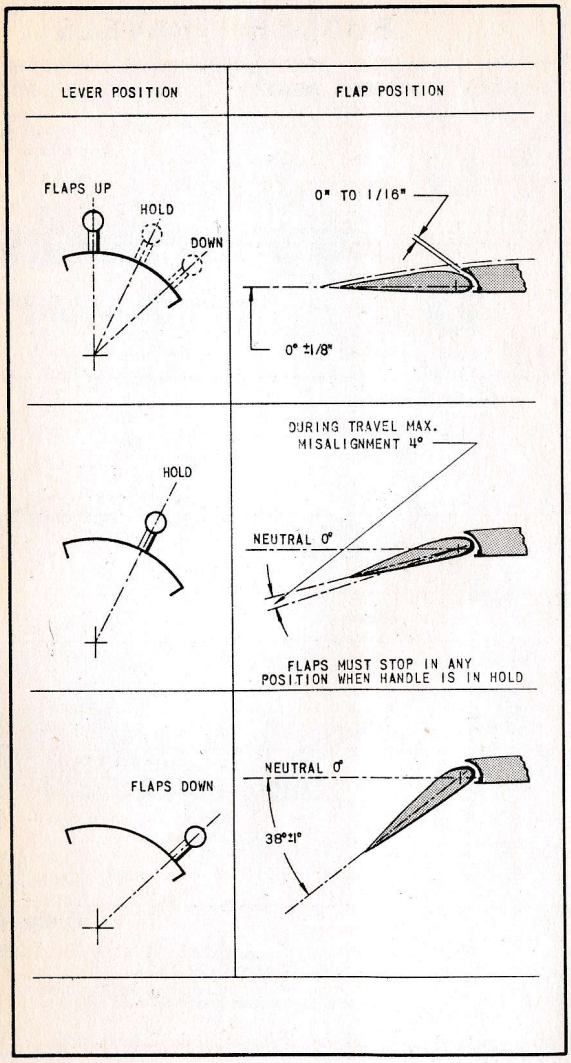
RUDDER CABLE TENSION 100 ± 10 LBS.

NOTE: FULL TRAVELS OF NOSE WHEEL BETWEEN LEFT & RIGHT TO BE WITHIN 5° OF EACH OTHER

WITH RUDDER T/E 3 INCHES L AND R, NOSE WHEEL TURNS AT LEAST ONE DEGREE, L AND R ARE WITHIN 1-1/2° OF EACH OTHER

WHEN EITHER UPPER OR LOWER END OF TRIM IS IN LINE WITH RUDDER, THE MISALIGNMENT AT OPPOSITE END SHOULD NOT EXCEED 1/8 INCH. FREE PLAY AT TAB T/E MUST NOT EXCEED 1/16 INCH.

Control Surface Travels
Sheet 2 of 2



42 Wing Flap Travels

STICK-LOADS IN POUNDS

AILERON	Breakout stick 1/8" from neutral	2 ± 1/4
	Aileron 13 ± 1/2° up	12 - 15
	13 ± 1/2° down	12 - 15
TAILPLANE	Stabilizer breakout leading edge 1/8° from neutral	2 - 5
	Stabilizer leading edge 1/16" from 10° down position	52 ± 5
	Stabilizer leading edge 1/16" from 6° up position	52 ± 5

NOTE

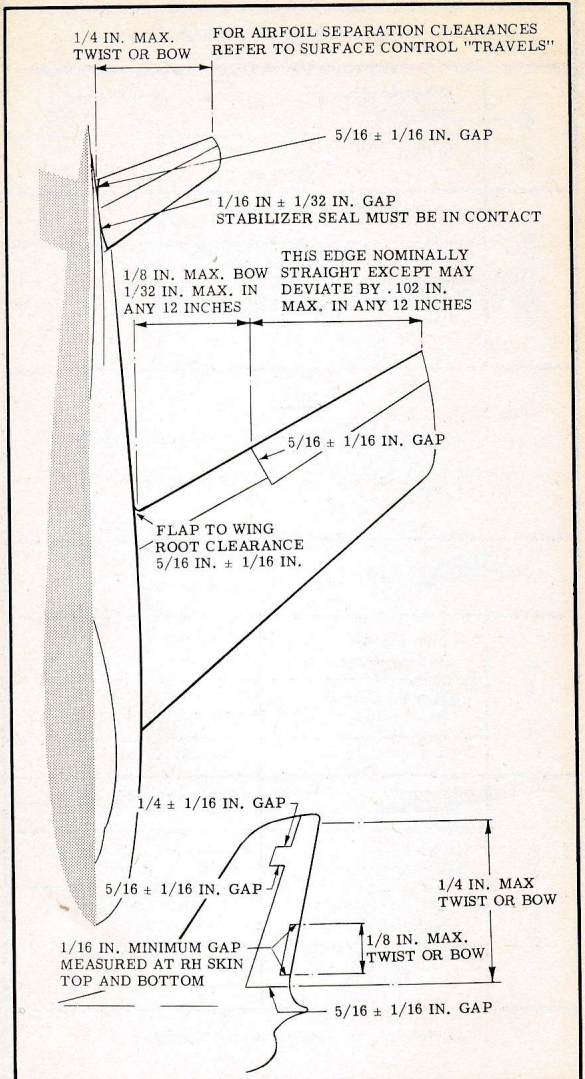
Tail plane breakouts not to differ more than 2 pounds.

Aileron stick-loads not to differ more than 2 pounds left and right.

AILERON AND TAILPLANE TRIM

AILERON	Left wing down (stick switch left)	Ail 5° ± 1°
	Right wing down (stick switch right)	Ail 5° ± 1°
	Take-off light on	Ail. neutral ± 1°
TAILPLANE	Nose up (stick switch aft)	Stabilizer leading edge down 5° 30' ± 15'
	Nose down (stick switch fwd)	Stabilizer leading edge up 3° 30' ± 30'
	Take-off light on (stick switch aft)	Stabilizer leading edge down 5° 30' ± 15'
	Tailplane trim travel Time Seconds. *	7 ± 2

*Trimming aft until light just comes on


1/4 IN. MAX.
TWIST OR BOW
FOR AIRFOIL SEPARATION CLEARANCES
REFER TO SURFACE CONTROL "TRAVELS"
5/16 ± 1/16 IN. GAP
1/16 IN ± 1/32 IN. GAP
STABILIZER SEAL MUST BE IN CONTACT
1/8 IN. MAX. BOW
1/32 IN. MAX. IN
ANY 12 INCHES
THIS EDGE NOMINALLY
STRAIGHT EXCEPT MAY
DEVIATE BY .102 IN.
MAX. IN ANY 12 INCHES
5/16 ± 1/16 IN. GAP
FLAP TO WING
ROOT CLEARANCE
5/16 IN. ± 1/16 IN.
1/4 ± 1/16 IN. GAP
5/16 ± 1/16 IN. GAP
1/4 IN. MAX
TWIST OR BOW
1/16 IN. MINIMUM GAP
MEASURED AT RH SKIN
TOP AND BOTTOM
1/8 IN. MAX.
TWIST OR BOW
5/16 ± 1/16 IN. GAP

Gaps and Permissible
Trailing Edge Bow

ACCEPTANCE APPROVAL - A CANADAIR "C" ENCLOSING THE INSPECTOR'S STAMP NUMBER.

EXAMPLE: C318 OR C318

CABLE PROOF-LOADING -

EXAMPLE: B

FLASH-WELD PROOF LOADING -

EXAMPLE: CPL

WELDER'S MARK -

EXAMPLE: W22

MAGNAFLUX -

EXAMPLE: M 8

PARTS REJECTED -

EXAMPLE: "REJ"

PARTS APPROVED AFTER REVIEW BY MATERIAL REVIEW BOARD -

EXAMPLE: 28

PARTS FUNCTIONALLY TESTED -

EXAMPLE: 3T4 OR T 36

PARTS MADE FROM SUBSTITUTED MATERIAL (AUTHORIZED) -

"X" ADJACENT TO PART NUMBER.

PARTS X-RAYED -

100% XA ON ALL PARTS (I.E. X AND A LETTER IN MONOGRAM FORM)

25% 25 ON UN-EXAMINED PARTS.

10% 10 ON UN-EXAMINED PARTS.

FLORESCENT PENETRANT (ZYGLO) - CZ

DYE PENETRANT (DY-CHECK) - CD 24

Three separate 3000 psi hydraulic systems are provided; the normal flight control and the alternate flight control system, which operate the ailerons and the horizontal tail plane; and the utility system, which operates the speed brakes, the landing gear, the nose wheel steering and the wheel brakes. The normal flight control and the utility systems are powered by engine-driven pumps, with alternate operation of the flight control system by an electrically-driven pump. An accumulator provides for emergency nose gear lowering.

Hydraulic Fluid

All systems use hydraulic fluid, Specification 3-GP-26a (MIL-O-5606). Micronic filters of 10 micron screening capacity are incorporated in both systems and all fluid added is to be passed through a 10 micron filter, such as AN6234.

Reservoirs

Flight control system reservoirs: one each normal and alternate, 50 cu. in. capacity, with relief valves set at 60 (+5. -0) psi, both pressurized by compensators.

Utility system main reservoir: regulated to between 6.8 and 11.8 psi absolute by a pressure regulator.

Compensators

Normal and alternate: cylinder type, with dual springs and indicator stem. The stem is fully exposed and the major spring bottomed at 40 psi. The minor spring bottoms at 60 psi and is not effective on the stem. Head pressure is built up in the compensator by wobble pump operation until stems are exposed and reservoir relief valves are cracked.

Pumps

Flight control: self-regulating, variable displacement, mounted on engine accessory drive section. Maximum output 4.7 Imperial (5.7 U.S.) gpm at 2700 (+160 -60) psi; maximum pressure 3000 (+160 - 60) psi.

Flight control - Alternate: electrically-driven, constant-displacement piston-type. Output .4 Imp (.5 U.S.) gpm at 3000 ($\pm$ 160) psi.

Utility: engine-driven, mounted on engine accessory drive section. Maximum output 5 Imp (5.9 U.S.) gpm.

Hydraulic Data
Sheet 1 of 4

Accumulators

Flight control system: one normal, one emergency, self-displacing, 49.8 cu. in. fluid capacity, pre-charged with air to 600 (+50-0) psi.

Spped brake system: one cylindrical, floating-piston type, fluid capacity 130 cu. in. precharged with air to 1200 psi. The accumulator provides a reserve, allowing approximately two speed brake openings. (Accumulator deleted on aircraft 23100 and subsequent.)

Relief Valves

Refer to preceding note for relief valves (head pressure limiting and expansion loss) in flight control reservoirs.

Flight control emergency pump overload protection: 3400 psi.

Utility system pressure gallery overload protection and relief: 3450 psi.

Aileron strut pressure lines, thermal expansion relief in lines between aileron blow-back check valves and struts: 3400 psi.

Speed brake pressure lines, thermal expansion relief: 4000 psi.

Pressure Transmitters

Three transmitters accompanied by snubbers for shock protection, utility system at centre wing front spar (upper), flight control at centre wing front spar (lower), flight control emergency in speed brake well.

Transfer Valves

Flight control normal: at centre wing front spar, two-position, pressure (normal) or return.

Flight control alternate: in speed brake well, two position, pressure to accumulators and struts open to return (normal), pressure to accumulators and struts in emergency.

Control Surface Struts

Ailerons: stroke 1.447 in., displacement to extend or retract: 2.94 cu. in.

Horizontal tailplane: stroke 3.608 in., displacement to extend or retract 13 cu. in.

Selector Valves Utility System

Landing gear and door valves: straddled by check valves, one at inlet to prevent back flow, one at return to prevent loss of fluid from the utility system in case of line failure in the landing gear sub-system.

Actuating Struts, Utility System

Main gear door strut: stroke 7.60 in.; displacement to extend 7.55 cu. in.; retract 5.66 cu. in.

Nose gear door strut: stroke 5.063 in.; displacement to extend 5.03 cu. in.; retract 4.04 cu. in.

Main gear uplock strut: stroke 1 in.; displacement to extend .196 cu. in.; retract .086 cu. in.

Main gear downlock strut: stroke 1.25 in.; displacement to extend .463 cu. in.; retract .402 cu. in. This strut contains a shuttle valve which opens at the end of the withdrawal stroke to admit fluid, through restrictor, to the up side of the main gear actuating strut.

Main gear actuating strut: stroke 5.78 in.; displacement to extend 7.83 cu. in.; retract 6.04 cu. in.

Nose gear actuating strut: stroke 4.406 in.; displacement to extend 7.16 cu. in.; retract 5.79 cu. in.

Nose gear helper strut: stroke 6.5 in.; displacement to extend 6.46 cu. in.; retract 4.84 cu. in.

Speed brake actuating strut: stroke 10.175 in.; displacement to extend 30 cu. in.; retract 14.89 cu. in.

Speed Brake Details

Dump valve: (deleted on aircraft 23030 and subsequent) manually operated, two-position, for emergency dumping only. The valve handle in the cockpit is lockwired OFF by .015 brass lockwire.

Flow restrictors: 2 gpm at 3000 psi, one restricting inward flow from the open sides of the struts, one restricting outward flow to the close sides of the struts, to prevent the doors slamming doors shut under air loads when selected to IN.

Quantity measuring fuses: (deleted on aircraft 23030 and subsequent) to shut off flow in case of a broken line in the speed brake wells. Must not be transposed. The 50 size goes to the ram (small) side of strut and the 100 size goes to the head (big) side of strut. Transposition will not permit full open strokes.

Steering Details

Steer-damp unit: piston-type, with selector valve connected to rudder pedals, containing a clutch which engages at 300-600 psi, and a spring pressure chamber to store 75 psi for damping. A filter protects steer-damp unit.

Pressure reducing valve: reduces 3000 psi system pressure to 800-1100 psi for steering.

Wheel Brake Details

Brake master cylinders: extends under pull to displace trapped fluid into the wheel units. Utility pressure is admitted to the piston head to assist in application.

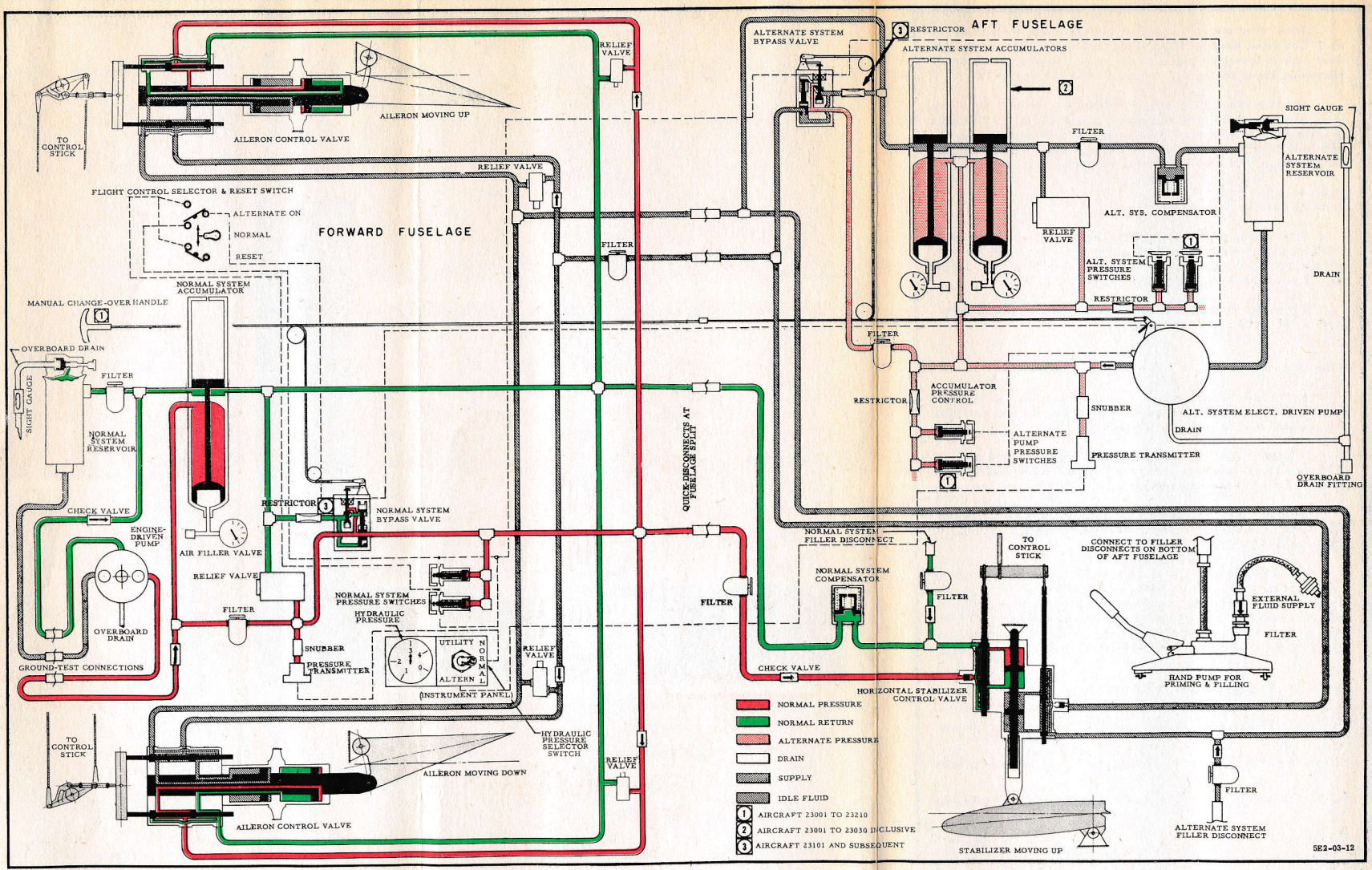
A pedal load of 385 inch-pounds must produce 350 ± 25 psi at brake with utility pressure on. A pedal load of 550 inch-pounds must produce 130 psi minimum at brake without utility pressure.

Parking valve: initial movement at 170 psi, piston bottoms at 425 psi. Contains two poppet valves and a spring chamber to store parking pressure.

Wheel brake units: multi-disc with pressure applied by annular ring. Contains removable wear-compensating shim, and wear-indicating adjusting rod. Adjuster rod extension 25/32 in. indicates brake is new. Adjuster rod extension 3/8 to 1/8 indicates compensating shim should be removed. Adjuster rod extension 3/8 to 1/8 in. (second time) indicates brakes need relining.

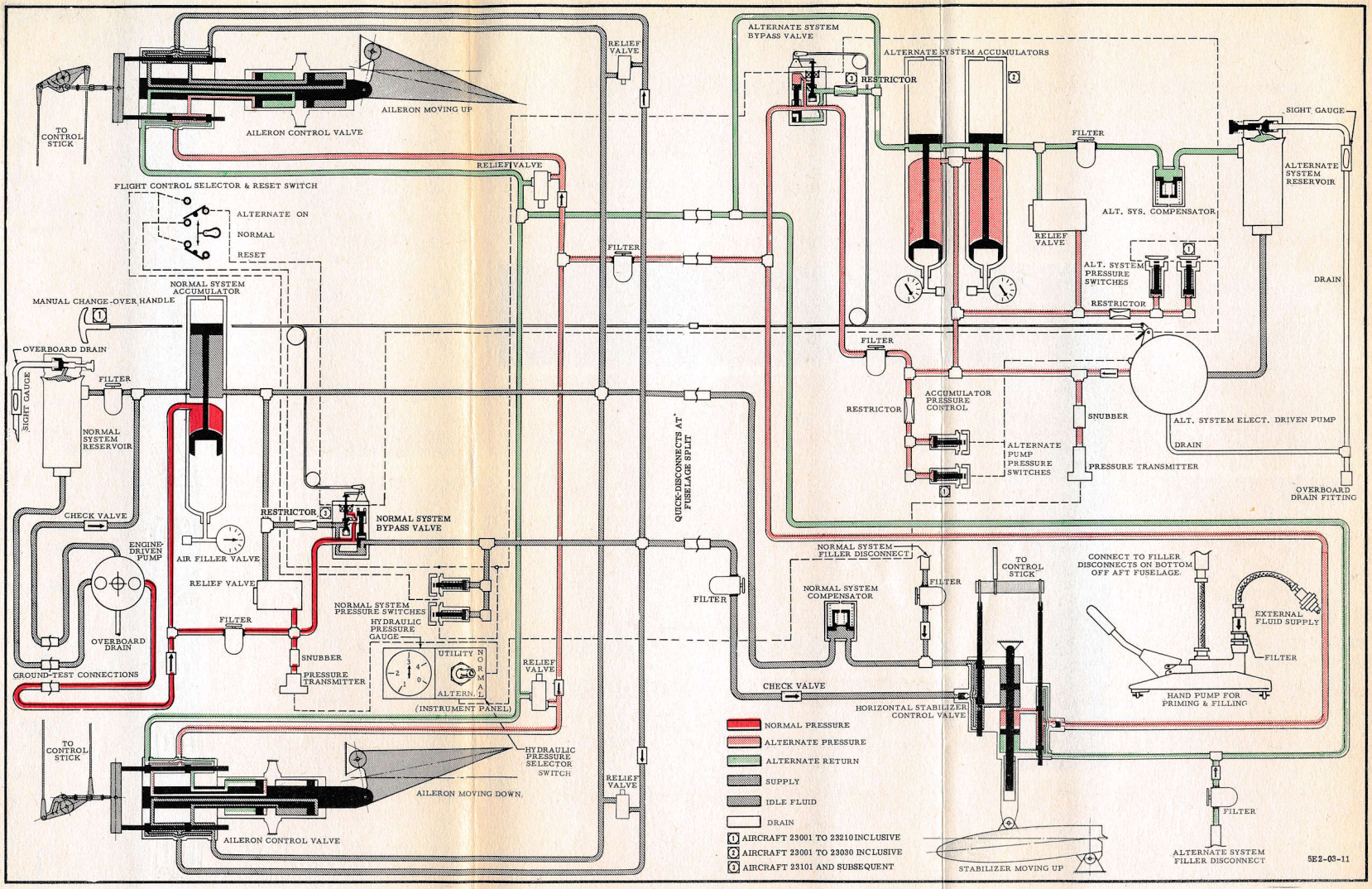
Permissible out of flatness for stator plates	.008 inch
Torque on drive sleeve bolt nuts	125-150 inch pounds
Torque - splined flange to brake unit	460-690 inch pounds
Permissible length of crack in rotor segment	.380 inch maximum
Running clearance	.030-.060 inch

Hydraulic Data
Sheet 4 of 4



Revised July 56

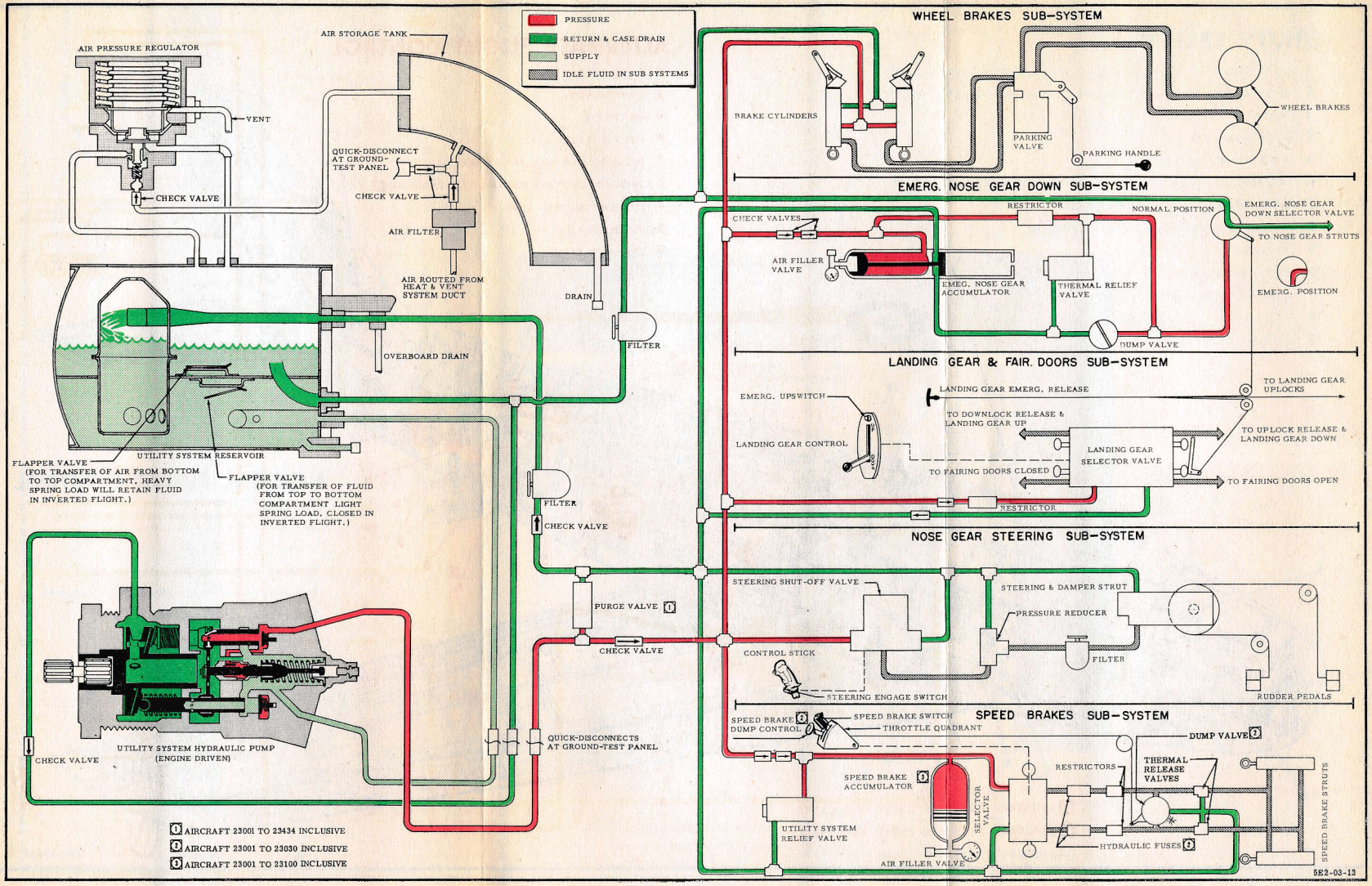
Flight Control Hydraulics Normal System Operating



Revised July 56

Flight Control Hydraulics Normal System Operating

Sheet 2 of 2



Revised July 56

Utility Hydraulic System Schematic Sub-systems at Rest

UTILITY SYSTEM

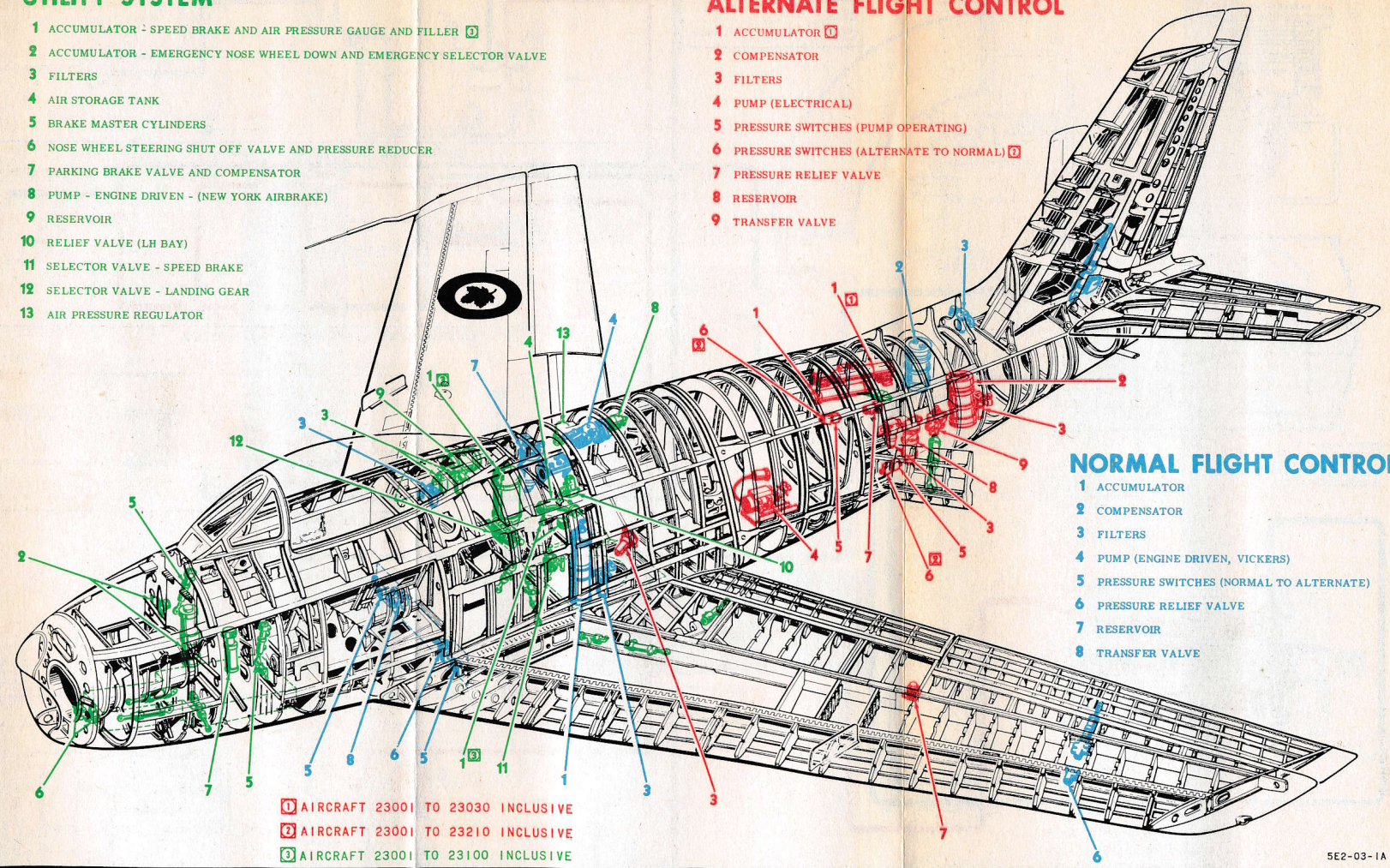
1 ACCUMULATOR - SPEED BRAKE AND AIR PRESSURE GAUGE AND FILLER [1]
2 ACCUMULATOR - EMERGENCY NOSE WHEEL DOWN AND EMERGENCY SELECTOR VALVE
3 FILTERS
4 AIR STORAGE TANK
5 BRAKE MASTER CYLINDERS
6 NOSE WHEEL STEERING SHUT OFF VALVE AND PRESSURE REDUCER
7 PARKING BRAKE VALVE AND COMPENSATOR
8 PUMP - ENGINE DRIVEN - (NEW YORK AIRBRAKE)
9 RESERVOIR
10 RELIEF VALVE (LH BAY)
11 SELECTOR VALVE - SPEED BRAKE
12 SELECTOR VALVE - LANDING GEAR
13 AIR PRESSURE REGULATOR

ALTERNATE FLIGHT CONTROL

1 ACCUMULATOR [1]
2 COMPENSATOR
3 FILTERS
4 PUMP (ELECTRICAL)
5 PRESSURE SWITCHES (PUMP OPERATING)
6 PRESSURE SWITCHES (ALTERNATE TO NORMAL) [1]
7 PRESSURE RELIEF VALVE
8 RESERVOIR
9 TRANSFER VALVE

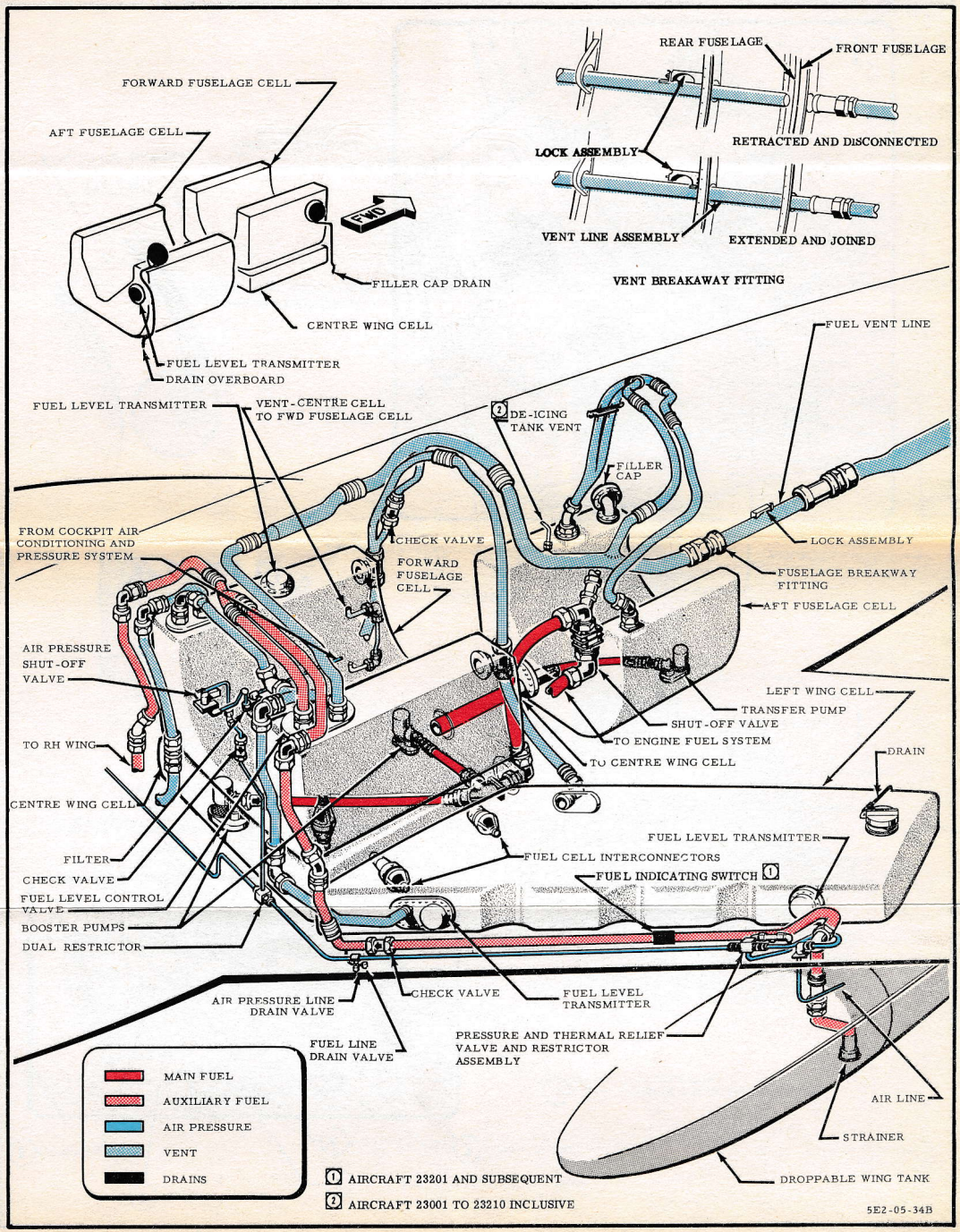
NORMAL FLIGHT CONTROL

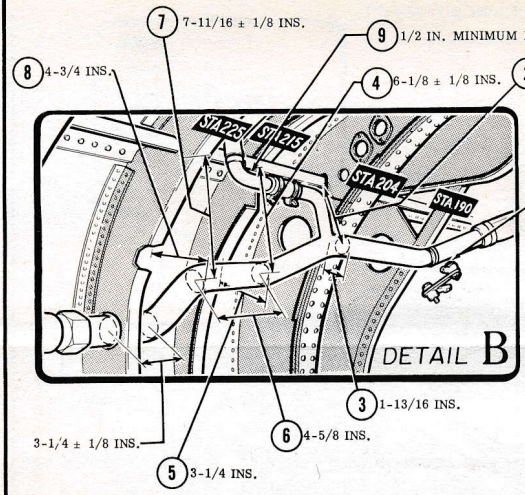
1 ACCUMULATOR
2 COMPENSATOR
3 FILTERS
4 PUMP (ENGINE DRIVEN, VICKERS)
5 PRESSURE SWITCHES (NORMAL TO ALTERNATE)
6 PRESSURE RELIEF VALVE
7 RESERVOIR
8 TRANSFER VALVE

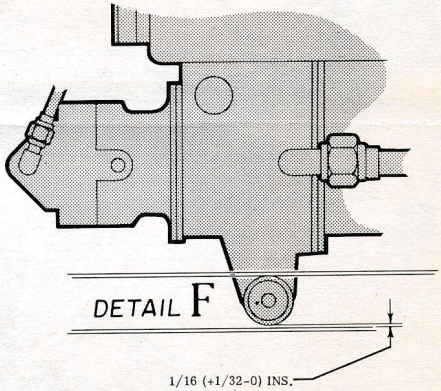


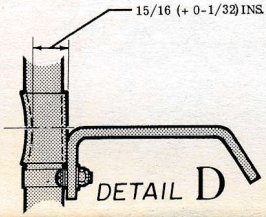
[1] AIRCRAFT 23001 TO 23030 INCLUSIVE
[2] AIRCRAFT 23001 TO 23210 INCLUSIVE
[3] AIRCRAFT 23001 TO 23100 INCLUSIVE

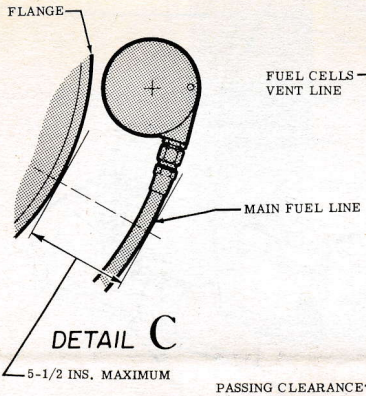
5E2-03-1A

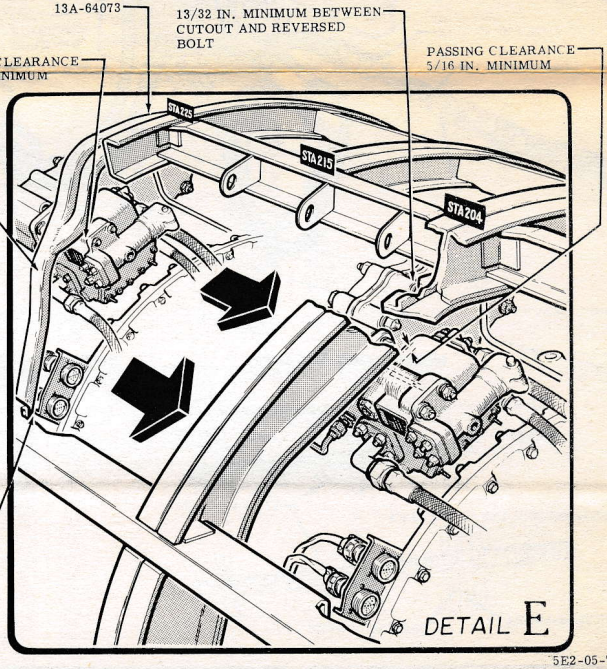

FORWARD FUSELAGE CELL
AFT FUSELAGE CELL
FWD
FILLER CAP DRAIN
CENTRE WING CELL
FUEL LEVEL TRANSMITTER
DRAIN OVERBOARD
REAR FUSELAGE
FRONT FUSELAGE
RETRACTED AND DISCONNECTED
LOCK ASSEMBLY
VENT LINE ASSEMBLY
EXTENDED AND JOINED
VENT BREAKAWAY FITTING
FUEL VENT LINE
FUEL LEVEL TRANSMITTER
VENT-CENTRE CELL TO FWD FUSELAGE CELL
2 DE-ICING TANK VENT
FILLER CAP
FROM COCKPIT AIR CONDITIONING AND PRESSURE SYSTEM
CHECK VALVE
FORWARD FUSELAGE CELL
LOCK ASSEMBLY
FUSELAGE BREAKWAY FITTING
AFT FUSELAGE CELL
AIR PRESSURE SHUT-OFF VALVE
LEFT WING CELL
TRANSFER PUMP
SHUT-OFF VALVE
TO ENGINE FUEL SYSTEM
TO CENTRE WING CELL
TO RH WING
DRAIN
CENTRE WING CELL
FUEL LEVEL TRANSMITTER
FILTER
FUEL CELL INTERCONNECTORS
CHECK VALVE
FUEL INDICATING SWITCH 1
FUEL LEVEL CONTROL VALVE
BOOSTER PUMPS
DUAL RESTRICTOR
AIR PRESSURE LINE DRAIN VALVE
CHECK VALVE
FUEL LEVEL TRANSMITTER
FUEL LINE DRAIN VALVE
PRESSURE AND THERMAL RELIEF VALVE AND RESTRICTOR ASSEMBLY
AIR LINE
STRAINER
DROPPABLE WING TANK
MAIN FUEL
AUXILIARY FUEL
AIR PRESSURE
VENT
DRAINS
1 AIRCRAFT 23201 AND SUBSEQUENT
2 AIRCRAFT 23001 TO 23210 INCLUSIVE
5E2-05-34B


7 7-11/16 ± 1/8 INS.
9 1/2 IN. MINIMUM PIPE TO LONGERON
8 4-3/4 INS.
4 6-1/8 ± 1/8 INS.
2 3-3/4 ± 1/8 INS.
1 5/8 IN. MINIMUM (TO BE MAINTAINED DURING INSTALLATION.
STA 225
STA 215
STA 204
STA 190
DETAIL B
3 1-13/16 INS.
3-1/4 ± 1/8 INS.
6 4-5/8 INS.
5 3-1/4 INS.

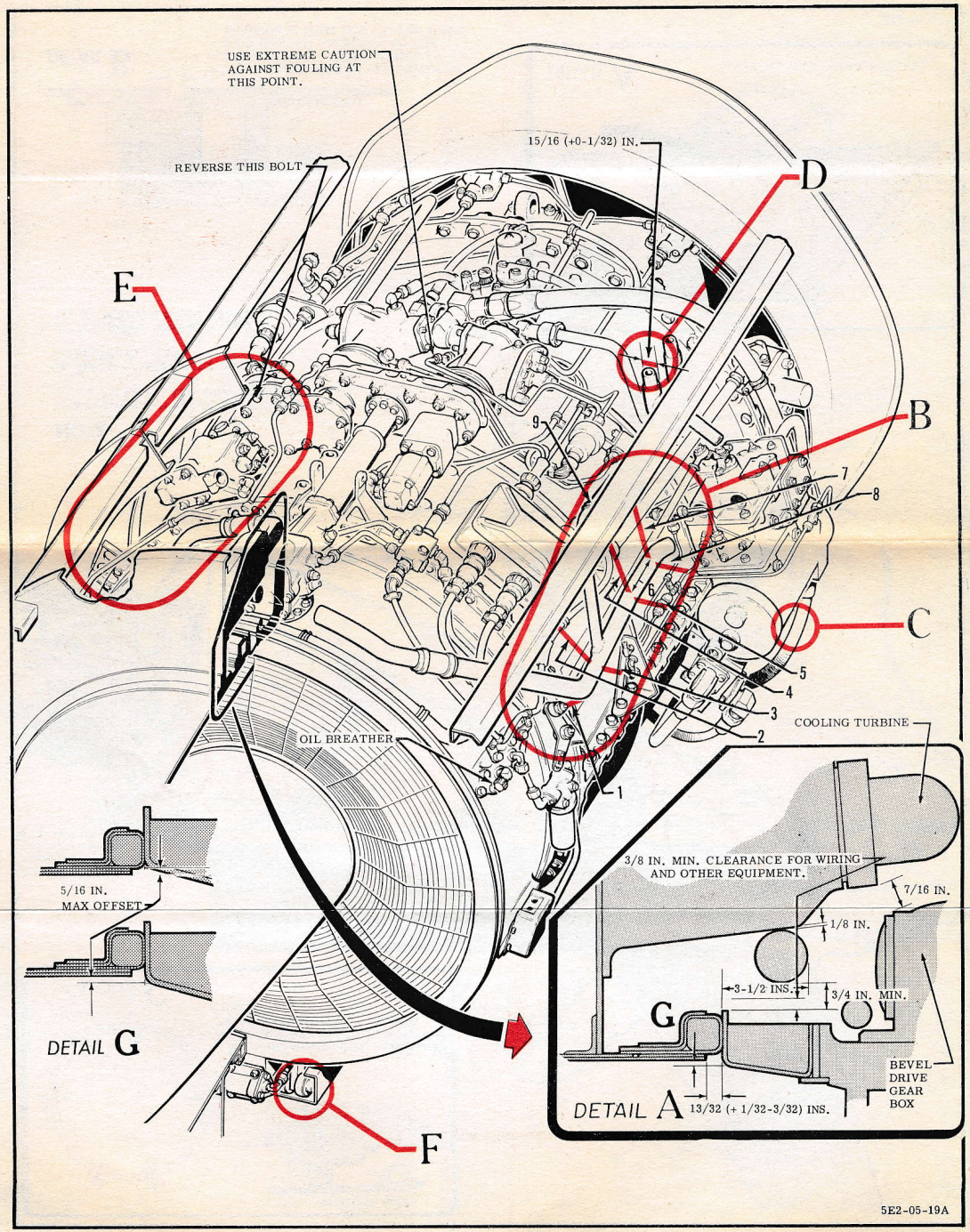

DETAIL F
1/16 (+1/32-0) INS.

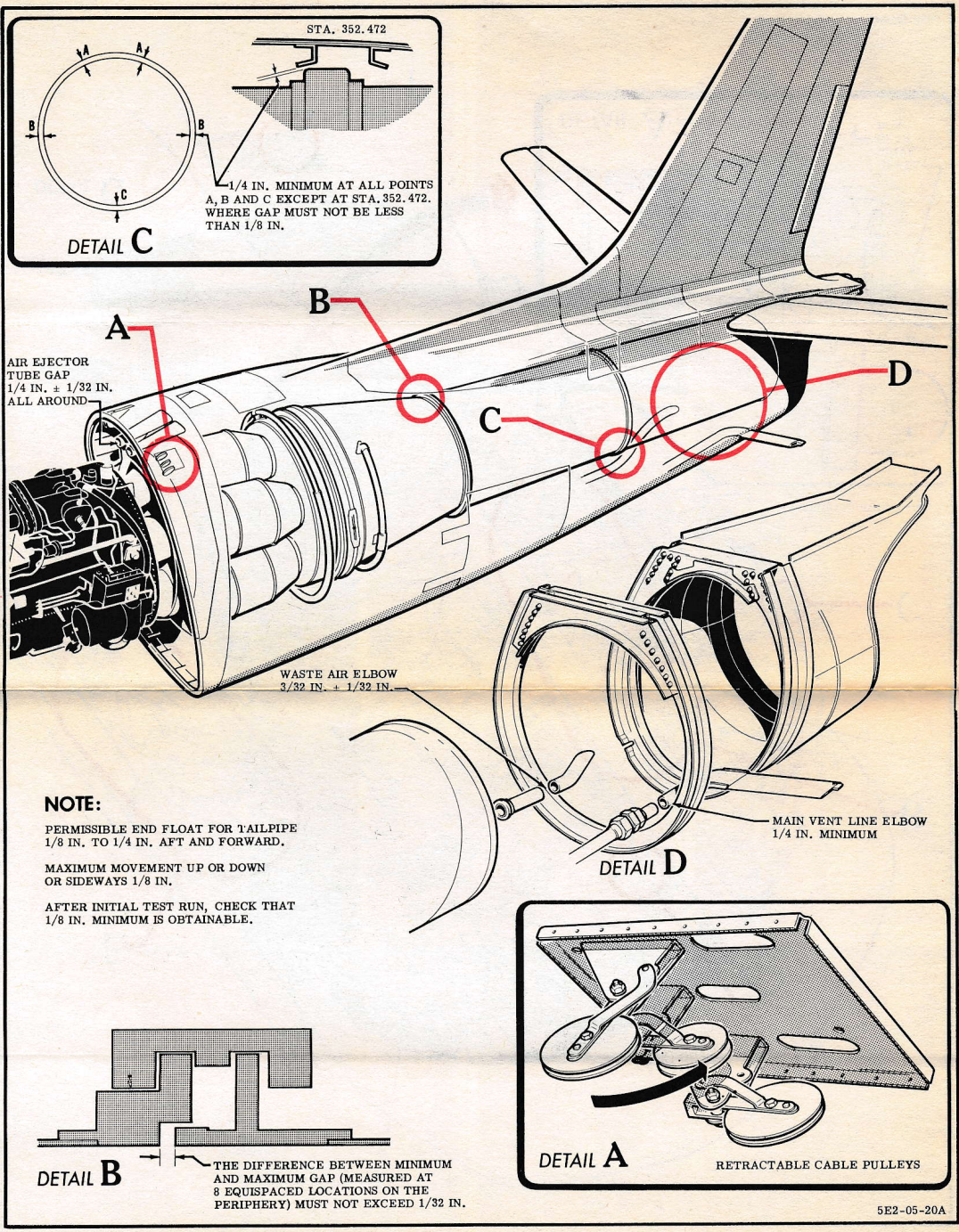

15/16 (+ 0-1/32) INS.
DETAIL D

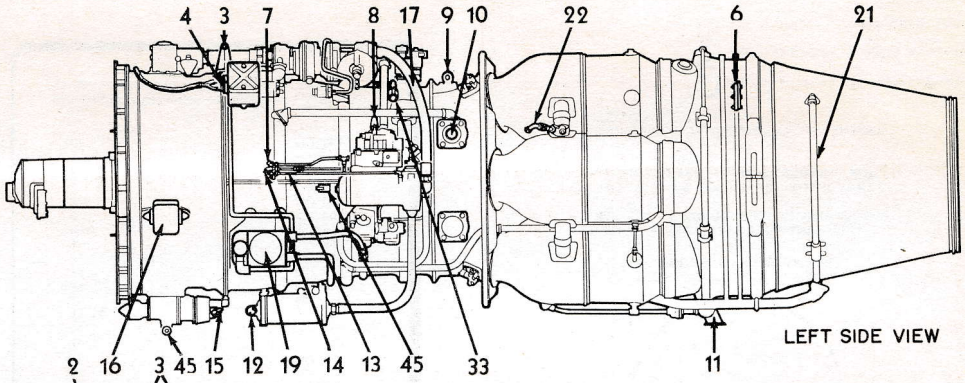

FLANGE
MAIN FUEL LINE
DETAIL C
5-1/2 INS. MAXIMUM

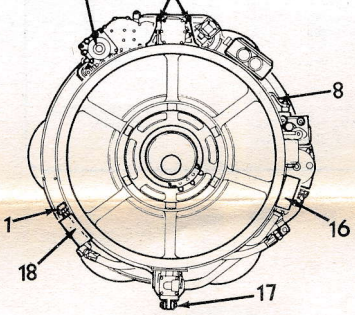

13A-64073
13/32 IN. MINIMUM BETWEEN CUTOUT AND REVERSED BOLT
PASSING CLEARANCE 1/2 IN. MINIMUM
PASSING CLEARANCE 5/16 IN. MINIMUM
FUEL CELLS VENT LINE
PASSING CLEARANCE 3/4 IN. MINIMUM
STA 225
STA 215
STA 204
DETAIL E

5E2-05-70A

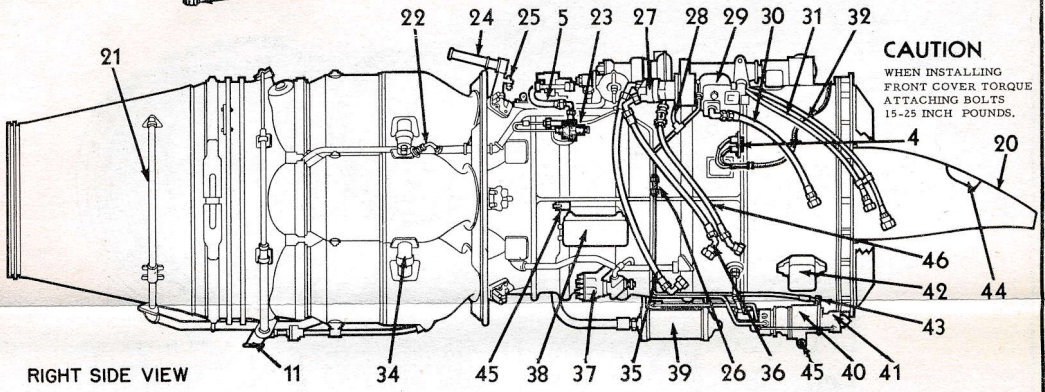

USE EXTREME CAUTION AGAINST FOULING AT THIS POINT.
REVERSE THIS BOLT
15/16 (+0-1/32) IN.
D
E
B
C
F
9
7
8
5
4
3
2
1
OIL BREATHER
COOLING TURBINE
5/16 IN. MAX OFFSET
DETAIL G
3/8 IN. MIN. CLEARANCE FOR WIRING AND OTHER EQUIPMENT.
7/16 IN.
1/8 IN.
3-1/2 INS.
3/4 IN. MIN.
G
BEVEL DRIVE GEAR BOX
DETAIL A
13/32 (+ 1/32-3/32) INS.
5E2-05-19A


STA. 352.472
A
A
B
B
C
1/4 IN. MINIMUM AT ALL POINTS A, B AND C EXCEPT AT STA. 352.472. WHERE GAP MUST NOT BE LESS THAN 1/8 IN.
DETAIL C
A
B
C
D
AIR EJECTOR TUBE GAP 1/4 IN. ± 1/32 IN. ALL AROUND
WASTE AIR ELBOW 3/32 IN. ± 1/32 IN.
MAIN VENT LINE ELBOW 1/4 IN. MINIMUM
DETAIL D
NOTE:
PERMISSIBLE END FLOAT FOR TAILPIPE 1/8 IN. TO 1/4 IN. AFT AND FORWARD.
MAXIMUM MOVEMENT UP OR DOWN OR SIDEWAYS 1/8 IN.
AFTER INITIAL TEST RUN, CHECK THAT 1/8 IN. MINIMUM IS OBTAINABLE.
DETAIL B
THE DIFFERENCE BETWEEN MINIMUM AND MAXIMUM GAP (MEASURED AT 8 EQUISPACED LOCATIONS ON THE PERIPHERY) MUST NOT EXCEED 1/32 IN.
DETAIL A
RETRACTABLE CABLE PULLEYS
5E2-05-20A





1 OIL INLET CONNECTION FROM TANK
2 HYDRAULIC PUMP GEARBOX
3 FRONT MOUNTING BRACKET
4 ELECTRICAL CONNECTIONS
5 OIL RETURN TO TANK
6 REAR LIFTING EYES
7 PITOT HEAD (RAM AIR PRESSURE) CONNECTION
8 THROTTLE LEVER AND HP COCK
9 FORWARD LIFTING EYE
10 MAIN MOUNTING
11 WASTE AIR OUTLET
12 FUEL INLET
13 FUEL FILTER INLET PRESSURE
14 FUEL FILTER OUTLET PRESSURE
15 OIL DRAIN COCK
16 STARTER LEAD TERMINALS
17 FILTER TO FUEL PUMPS MANIFOLD
18 GENERATOR LEAD TERMINALS
19 FUEL FLOWMETER (AIRCRAFT 23006 -13-15-16-24-29-30-31-32-33 and 23039.

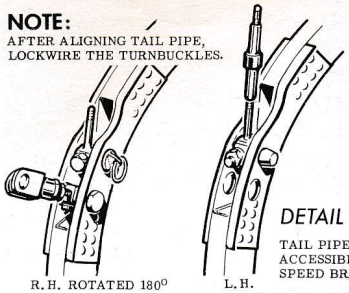


20 NOSE CONE
21 TAIL CONE COOLING AIR LINE
22 IGNITER
23 LUBRICATING OIL PRESSURE TRANSMITTER
24 AIR EJECTOR
25 FIRE DETECTOR
26 SEAL DRAINS CHECK VALVE
27 UTILITY HYDRAULIC PUMP
28 SEAL DRAINS
29 NORMAL FLIGHT CONTROL HYDRAULIC PUMP
30 NORMAL FLIGHT CONTROL SUCTION HOSE
31 NORMAL FLIGHT CONTROL PRESSURE HOSE
32 NORMAL FLIGHT CONTROL PUMP CASE DRAIN HOSE
33 HEAT AND VENT SYSTEM DISCONNECT
34 COMBUSTION CHAMBER INTERCONNECTORS
35 UTILITY SUCTION HOSE
36 UTILITY PRESSURE HOSE
37 FUEL FLOW DISTRIBUTOR
38 IGNITION EXCITER BOX
39 OIL COOLER
40 MAIN LUBRICATING OIL PUMP
41 AUXILIARY LUBRICATING OIL PUMP
42 GENERATOR TERMINAL BOX
43 SEAL DRAINS HOSE
44 GENERATOR ACCESS DOOR
45 INSTALLATION GUIDE ROLLERS
46 UTILITY PUMP CASE DRAIN

NOTE: FOR DETAILS OF ORENDA 10 AND 14 REFER TO EO-10B-10B-2 AND EO-10B-10BA-2

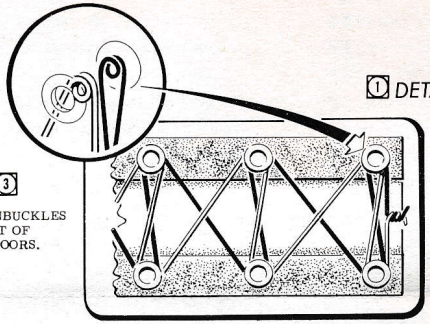
5E2-05-17A

NOTE:
AFTER ALIGNING TAIL PIPE, LOCKWIRE THE TURNBUCKLES.



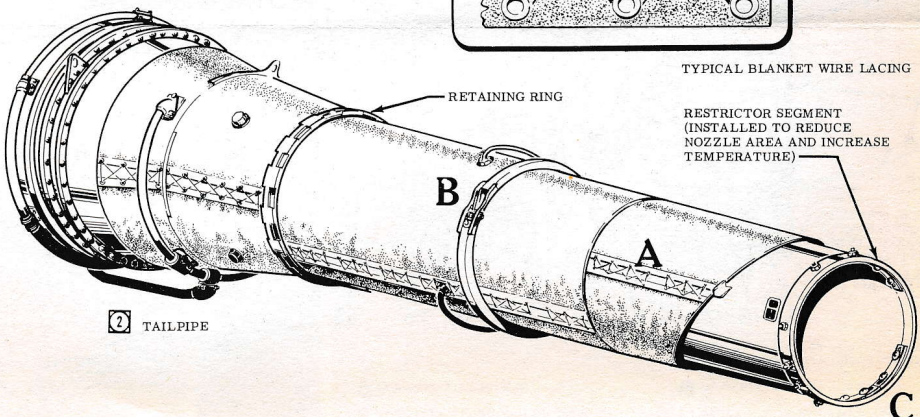
DETAIL B [3]

TAIL PIPE TURNBUCKLES ACCESSIBLE AFT OF SPEED BRAKE DOORS.



[1] DETAIL A

TYPICAL BLANKET WIRE LACING



[2] TAILPIPE

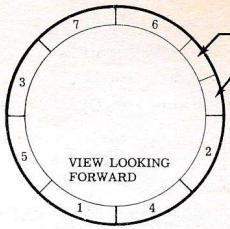
PERMISSIBLE END FLOAT FOR TAILPIPE 1/8 IN. TO 1/4 IN.

[2]

AMBIENT TEMPERATURE, °C	REQUIRED MAXIMUM TAIL PIPE TEMPERATURE AT 100% RPM Temp. Range °C.
30-26	700-710
25	699-709
24	698-708
23	697-707
22	696-706
21	695-705
20	694-704
19	693-703
18	692-702
17-16	691-701
15	690-700
14	689-699
13	688-698
12-11	687-697
10	686-696
9-8	685-695
7	684-694
6-5	683-693
4	682-692
3-2	681-691
1 - -9	680-690
-10	681-691

STABILIZE 2 MINUTES AT 98% AND 4 MINUTES AT 100% RPM BEFORE TAKING READING.

[1] DETAIL C



SEGMENTS TO BE INSTALLED IN SEQUENCE SHOWN ABOVE.

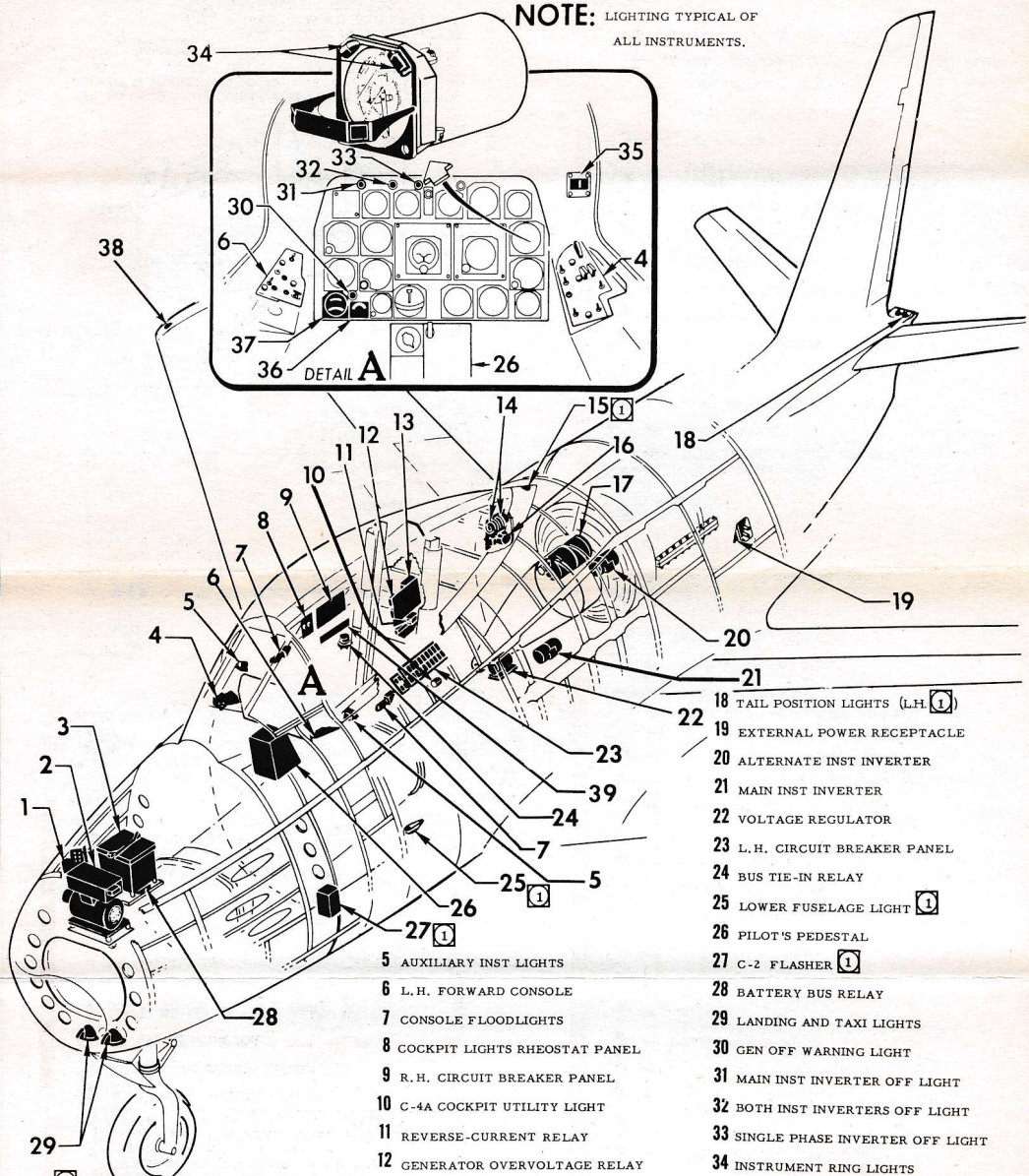
LUBRICATE ALL BOLTS WITH ANTI-SEIZE COMPOUND (SPECIFICATION NO. MIL-C-5544).

WITH A WRENCH LOOSEN NUT A FEW TURNS AND STRIKE HEAD OF BOLT SHARPLY. NUT WILL THEN TURN OFF FREELY.

SPARE RESTRICTOR SEGMENTS ARE STOWED WITH LOOSE EQUIPMENT.

[1] AIRCRAFT 23001 AND SUBSEQUENT
[2] AIRCRAFT 23001 TO 23370 INCLUSIVE
[3] AIRCRAFT 23301 AND SUBSEQUENT

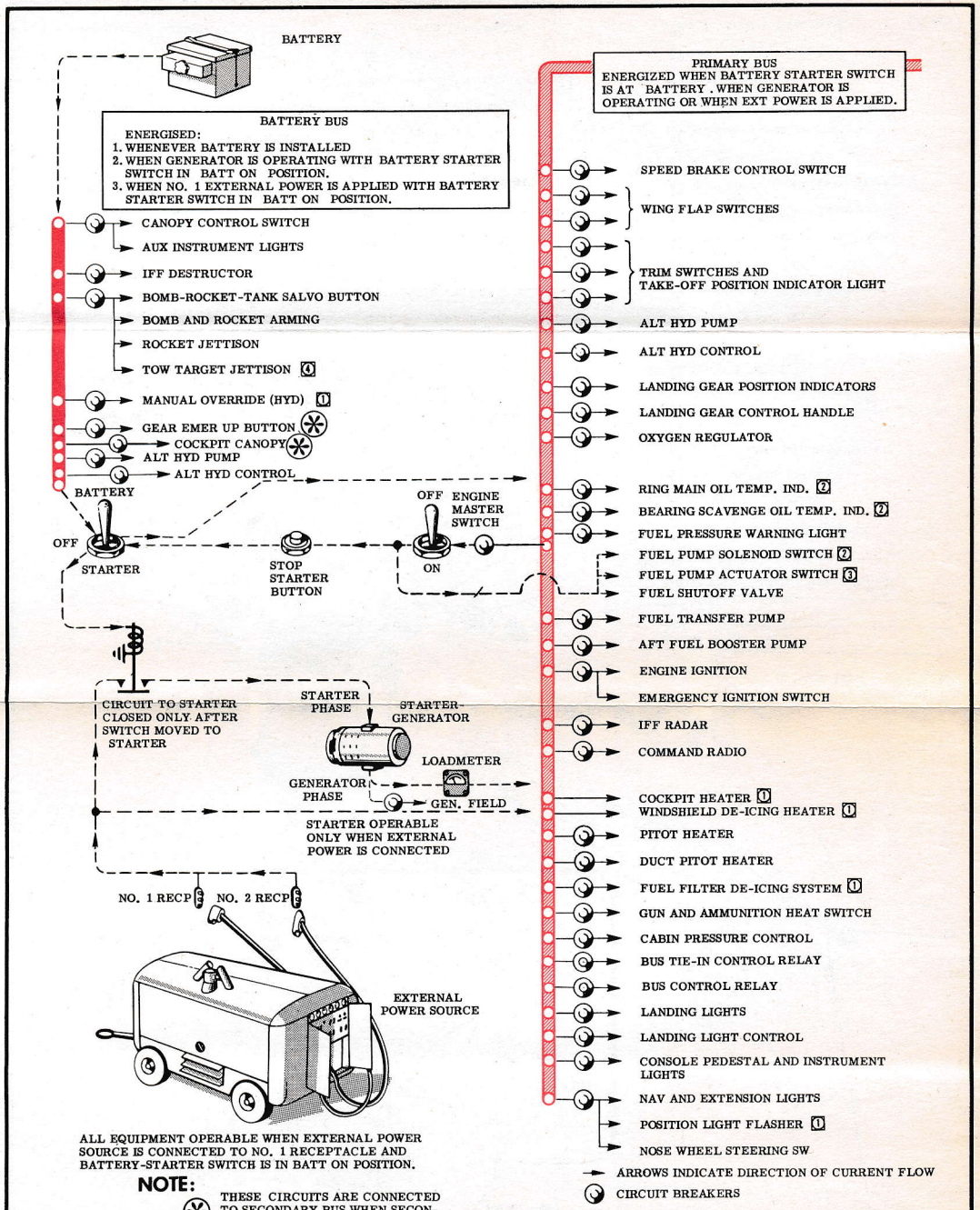
NOTE: LIGHTING TYPICAL OF ALL INSTRUMENTS.

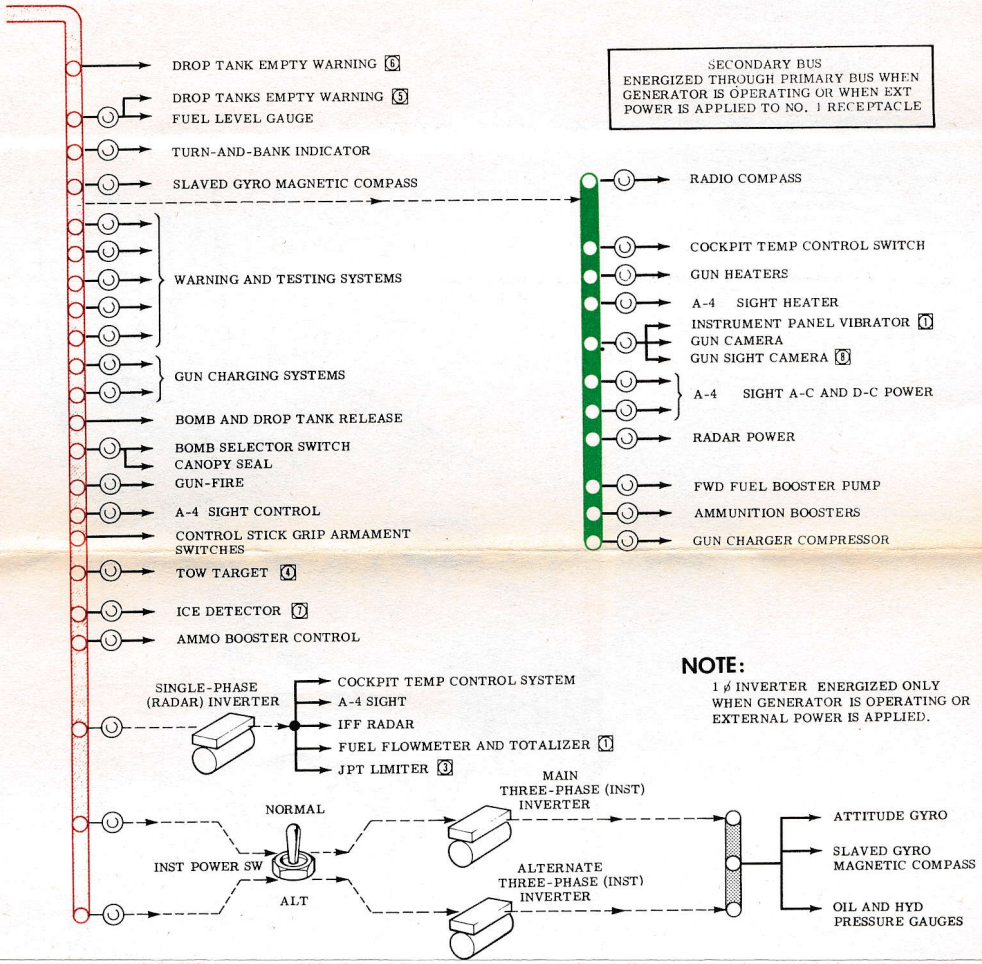


[1] AIRCRAFT 23001 TO 23210 INCLUSIVE

1 INSTRUMENT INVERTER TRANSFER RELAY
2 SINGLE PHASE INVERTER
3 BATTERY
4 R. H. FORWARD CONSOLE
5 AUXILIARY INST LIGHTS
6 L. H. FORWARD CONSOLE
7 CONSOLE FLOODLIGHTS
8 COCKPIT LIGHTS RHEOSTAT PANEL
9 R. H. CIRCUIT BREAKER PANEL
10 C-4A COCKPIT UTILITY LIGHT
11 REVERSE-CURRENT RELAY
12 GENERATOR OVERVOLTAGE RELAY
13 GENERATOR FIELD CONTROL RELAY
14 EXTERNAL POWER RELAYS
15 UPPER FUSELAGE LIGHTS [1]
16 STARTER RELAY
17 STARTER-GENERATOR
18 TAIL POSITION LIGHTS (L.H. [1])
19 EXTERNAL POWER RECEPTACLE
20 ALTERNATE INST INVERTER
21 MAIN INST INVERTER
22 VOLTAGE REGULATOR
23 L. H. CIRCUIT BREAKER PANEL
24 BUS TIE-IN RELAY
25 LOWER FUSELAGE LIGHT [1]
26 PILOT'S PEDESTAL
27 C-2 FLASHER [1]
28 BATTERY BUS RELAY
29 LANDING AND TAXI LIGHTS
30 GEN OFF WARNING LIGHT
31 MAIN INST INVERTER OFF LIGHT
32 BOTH INST INVERTERS OFF LIGHT
33 SINGLE PHASE INVERTER OFF LIGHT
34 INSTRUMENT RING LIGHTS
35 STANDBY COMPASS LIGHT
36 AMMETER
37 VOLTMETER
38 WING POSITION LIGHTS
39 R. H. CONSOLE CB PANEL

5E2-07-1

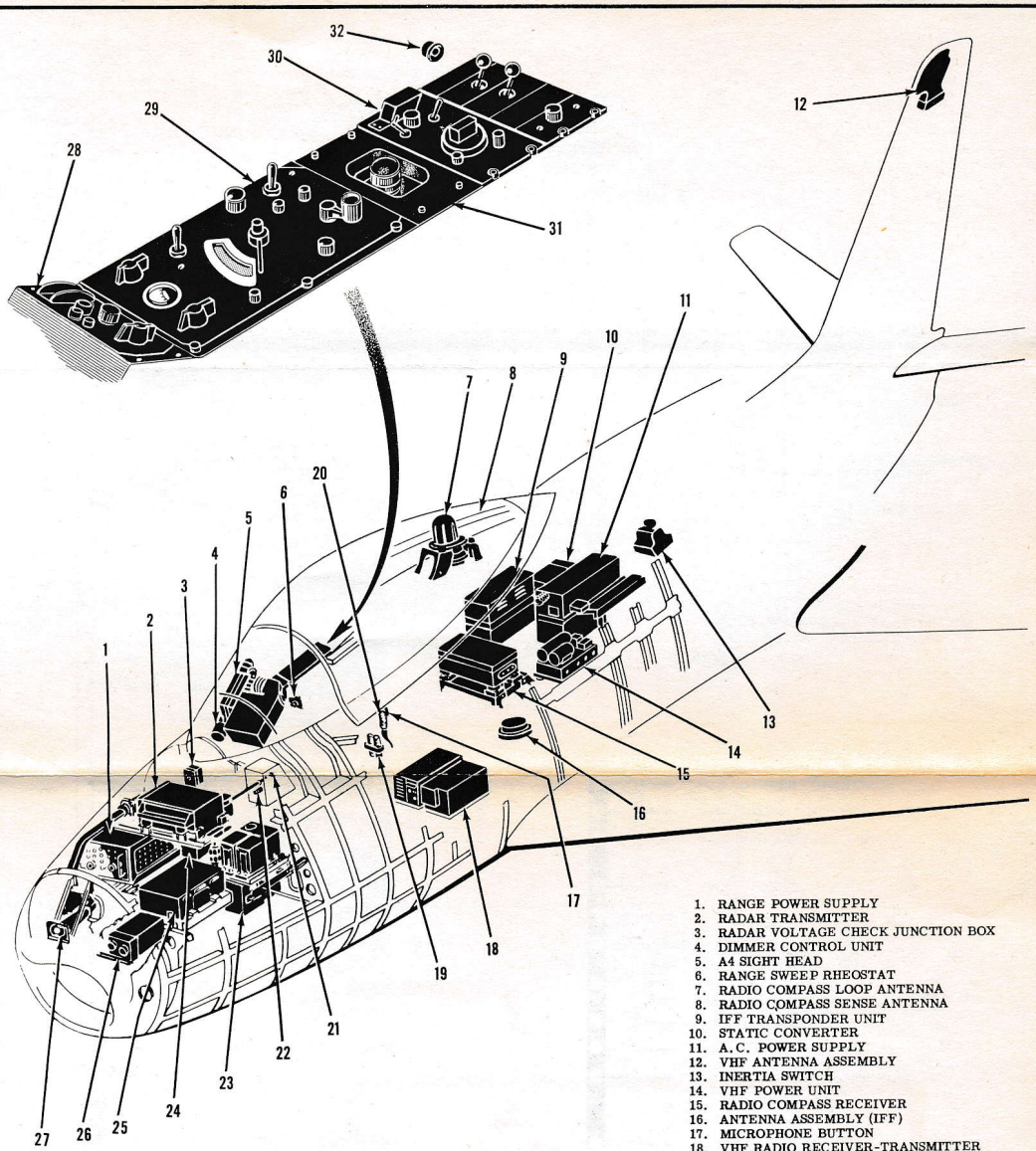

BATTERY
BATTERY BUS
ENERGISED:
1. WHENEVER BATTERY IS INSTALLED
2. WHEN GENERATOR IS OPERATING WITH BATTERY STARTER SWITCH IN BATT ON POSITION.
3. WHEN NO. 1 EXTERNAL POWER IS APPLIED WITH BATTERY STARTER SWITCH IN BATT ON POSITION.
PRIMARY BUS
ENERGIZED WHEN BATTERY STARTER SWITCH IS AT BATTERY . WHEN GENERATOR IS OPERATING OR WHEN EXT POWER IS APPLIED.
CANOPY CONTROL SWITCH
AUX INSTRUMENT LIGHTS
IFF DESTRUCTOR
BOMB-ROCKET-TANK SALVO BUTTON
BOMB AND ROCKET ARMING
ROCKET JETTISON
TOW TARGET JETTISON 4
MANUAL OVERRIDE (HYD) 1
GEAR EMER UP BUTTON
COCKPIT CANOPY
ALT HYD PUMP
ALT HYD CONTROL
BATTERY
OFF
STARTER
STOP STARTER BUTTON
OFF ENGINE MASTER SWITCH
ON
CIRCUIT TO STARTER CLOSED ONLY AFTER SWITCH MOVED TO STARTER
STARTER PHASE
STARTER-GENERATOR
LOADMETER
GENERATOR PHASE
GEN. FIELD
STARTER OPERABLE ONLY WHEN EXTERNAL POWER IS CONNECTED
NO. 1 RECP
NO. 2 RECP
EXTERNAL POWER SOURCE
SPEED BRAKE CONTROL SWITCH
WING FLAP SWITCHES
TRIM SWITCHES AND TAKE-OFF POSITION INDICATOR LIGHT
ALT HYD PUMP
ALT HYD CONTROL
LANDING GEAR POSITION INDICATORS
LANDING GEAR CONTROL HANDLE
OXYGEN REGULATOR
RING MAIN OIL TEMP. IND. 2
BEARING SCAVENGE OIL TEMP. IND. 2
FUEL PRESSURE WARNING LIGHT
FUEL PUMP SOLENOID SWITCH 2
FUEL PUMP ACTUATOR SWITCH 3
FUEL SHUTOFF VALVE
FUEL TRANSFER PUMP
AFT FUEL BOOSTER PUMP
ENGINE IGNITION
EMERGENCY IGNITION SWITCH
IFF RADAR
COMMAND RADIO
COCKPIT HEATER 1
WINDSHIELD DE-ICING HEATER 1
PITOT HEATER
DUCT PITOT HEATER
FUEL FILTER DE-ICING SYSTEM 1
GUN AND AMMUNITION HEAT SWITCH
CABIN PRESSURE CONTROL
BUS TIE-IN CONTROL RELAY
BUS CONTROL RELAY
LANDING LIGHTS
LANDING LIGHT CONTROL
CONSOLE PEDESTAL AND INSTRUMENT LIGHTS
NAV AND EXTENSION LIGHTS
POSITION LIGHT FLASHER 1
NOSE WHEEL STEERING SW
ALL EQUIPMENT OPERABLE WHEN EXTERNAL POWER SOURCE IS CONNECTED TO NO. 1 RECEPTACLE AND BATTERY-STARTER SWITCH IS IN BATT ON POSITION.
NOTE:
THESE CIRCUITS ARE CONNECTED TO SECONDARY BUS WHEN SECONDARY BUS IS ENERGIZED.
ARROWS INDICATE DIRECTION OF CURRENT FLOW
CIRCUIT BREAKERS
5E2-07-3A



IN CASE MAIN THREE-PHASE (INST) INVERTER FAILS, UNITS NORMALLY POWERED BY THE MAIN THREE-PHASE (INST) INVERTER ARE TRANSFERRED TO THE ALTERNATE THREE-PHASE (INST) INVERTER BY TURNING INSTRUMENT POWER SWITCH TO ALT.

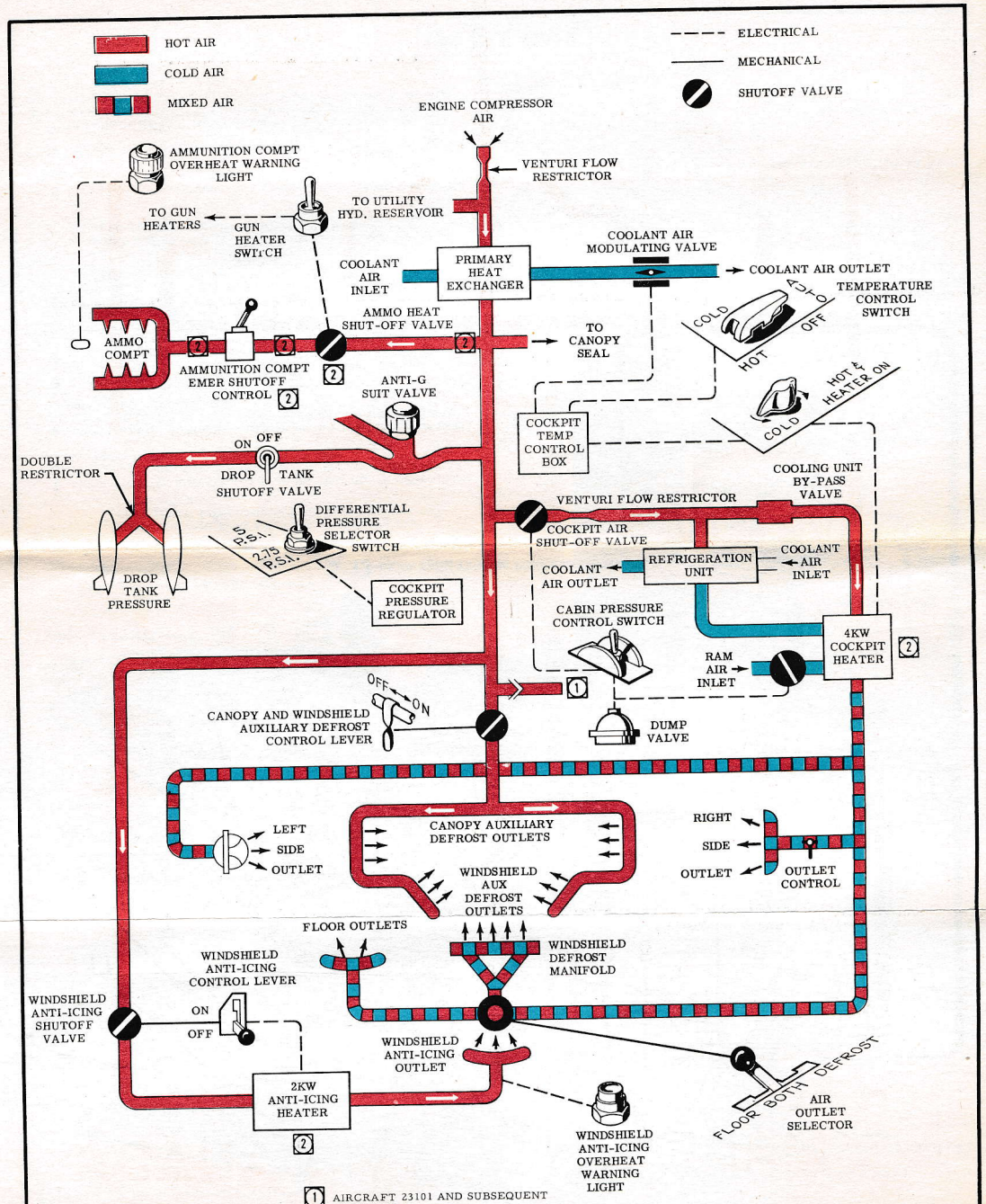
[1] AIRCRAFT 23001 TO 23210 INCLUSIVE
[2] AIRCRAFT 23001 TO 23370 INCLUSIVE
[3] AIRCRAFT 23371 AND SUBS
[4] AIRCRAFT 23001 TO 23430 INCLUSIVE
[5] AIRCRAFT 23201 TO 23300 INCLUSIVE
[6] AIRCRAFT 23301 AND SUBSEQUENT
[7] AIRCRAFT 23001 TO 23490 INCLUSIVE
[8] AIRCRAFT 23491 AND SUBSEQUENT

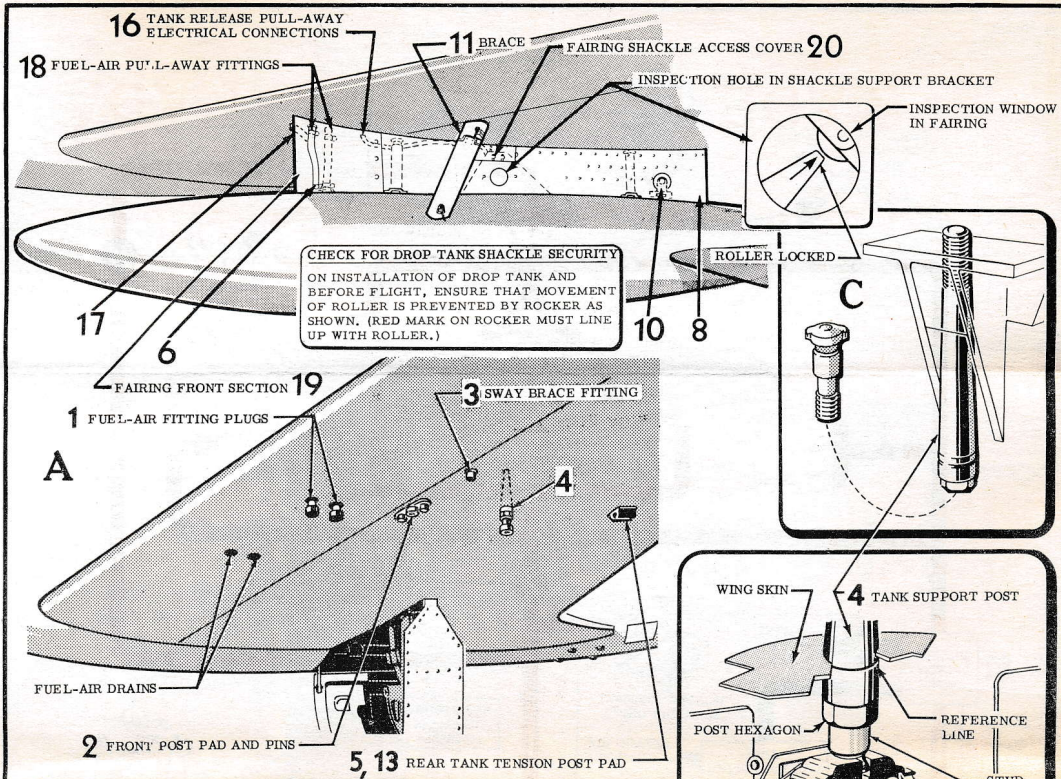
5E2-07-4A



1. RANGE POWER SUPPLY
2. RADAR TRANSMITTER
3. RADAR VOLTAGE CHECK JUNCTION BOX
4. DIMMER CONTROL UNIT
5. A4 SIGHT HEAD
6. RANGE SWEEP RHEOSTAT
7. RADIO COMPASS LOOP ANTENNA
8. RADIO COMPASS SENSE ANTENNA
9. IFF TRANSPONDER UNIT
10. STATIC CONVERTER
11. A.C. POWER SUPPLY
12. VHF ANTENNA ASSEMBLY
13. INERTIA SWITCH
14. VHF POWER UNIT
15. RADIO COMPASS RECEIVER
16. ANTENNA ASSEMBLY (IFF)
17. MICROPHONE BUTTON
18. VHF RADIO RECEIVER-TRANSMITTER
19. PILOT'S EQUIPMENT DISCONNECT BLOCK
20. MANUAL RANGE CONTROL
21. BOMB-TARGET WIND SCALE ASSEMBLY
22. SIGHT SELECTOR UNIT
23. RADAR RANGE SERVO UNIT
24. COMPUTER (A4 GUN SIGHT)
25. AMPLIFIER (A4 GUN SIGHT)
26. VOLTAGE REGULATOR
27. HORN ANTENNA
28. VHF RADIO CONTROL PANEL
29. RADIO COMPASS CONTROL PANEL
30. IFF RADIO CONTROL PANEL
31. FIELD TEST RECEPTACLE
32. VHF AND IFF GROUND TEST EMER. SW.

5E2-08-1A


HOT AIR
COLD AIR
MIXED AIR
ELECTRICAL
MECHANICAL
SHUTOFF VALVE
ENGINE COMPRESSOR AIR
VENTURI FLOW RESTRICTOR
AMMUNITION COMPT OVERHEAT WARNING LIGHT
TO UTILITY HYD. RESERVOIR
TO GUN HEATERS
GUN HEATER SWITCH
COOLANT AIR INLET
PRIMARY HEAT EXCHANGER
COOLANT AIR MODULATING VALVE
COOLANT AIR OUTLET
TEMPERATURE CONTROL SWITCH
COLD
OFF
HOT
AMMO COMPT
AMMO HEAT SHUT-OFF VALVE
TO CANOPY SEAL
AMMUNITION COMPT EMER SHUTOFF CONTROL
ANTI-G SUIT VALVE
COCKPIT TEMP CONTROL BOX
HOT & HEATER ON
COLD
DOUBLE RESTRICTOR
ON
OFF
DROP TANK SHUTOFF VALVE
DIFFERENTIAL PRESSURE SELECTOR SWITCH
5 P.S.I.
2.75 P.S.I.
DROP TANK PRESSURE
COCKPIT PRESSURE REGULATOR
VENTURI FLOW RESTRICTOR
COOLING UNIT BY-PASS VALVE
COCKPIT AIR SHUT-OFF VALVE
REFRIGERATION UNIT
COOLANT AIR OUTLET
COOLANT AIR INLET
CABIN PRESSURE CONTROL SWITCH
4KW COCKPIT HEATER
RAM AIR INLET
OFF
ON
CANOPY AND WINDSHIELD AUXILIARY DEFROST CONTROL LEVER
DUMP VALVE
LEFT SIDE OUTLET
CANOPY AUXILIARY DEFROST OUTLETS
WINDSHIELD AUX DEFROST OUTLETS
RIGHT SIDE OUTLET
OUTLET CONTROL
FLOOR OUTLETS
WINDSHIELD DEFROST MANIFOLD
WINDSHIELD ANTI-ICING CONTROL LEVER
WINDSHIELD ANTI-ICING SHUTOFF VALVE
ON
OFF
WINDSHIELD ANTI-ICING OUTLET
2KW ANTI-ICING HEATER
FLOOR
BOTH
DEFROST
AIR OUTLET SELECTOR
WINDSHIELD ANTI-ICING OVERHEAT WARNING LIGHT
1 AIRCRAFT 23101 AND SUBSEQUENT
2 AIRCRAFT 23001 TO 23210
5E2-04-3A



WARNING

MAKE CERTAIN THAT BATTERY AND EXTERNAL ELECTRICAL POWER SOURCE ARE DISCONNECTED FROM AIRCRAFT.

1 REMOVE FUEL AND AIR ADAPTER FITTING PLUGS UNDER WING. (SEE DETAIL A.) REMOVE FORWARD ATTACHMENT POINTS PLUGS FROM UNDER WING.

2 INSTALL PINS IN BOMB RACK FORWARD ATTACHMENT POINTS IN UNDERSIDE OF WING; THEN SECURE FORWARD TANK POST PAD ON PINS WITH MASKING TAPE.

3 REMOVE NO. 5 ROCKET POST HOLE PLUG.

4 SCREW STUD INTO SUPPORT POST (BY HAND ONLY, TO ENSURE THREAD FREEDOM) TO STUD BOTTOM SHOULDER, THEN BACK OUT UNTIL STUD TOP SHOULDER IS FLUSH WITH BOTTOM OF POST HEXAGON. SCREW SUPPORT POST INTO WING BY HAND UNTIL TOP OF POST HEXAGON ENTERS WING SURFACE, THEN BACK OFF UNTIL COLORED LINE IS FLUSH WITH LOWER SURFACE OF WING. (SEE DETAIL C.)

NOTE

IF UNDUE RESISTANCE IS ENCOUNTERED WHEN RUNNING POST OR STUD ALL THE WAY IN, REMOVE AND DISCARD POST.

5 SECURE REAR TANK POST PAD IN WING SOCKETS WITH MASKING TAPE.

6 INSTALL FUEL AND AIR HOSES AND FITTINGS ON TANK FITTINGS.

7 INSTALL TANK RELEASE SHACKLE IN TANK BRACKET SO THAT RELEASE SOLENOID IS ON THE FORWARD LEFT SIDE OF TANK. (DO NOT INSTALL SHACKLE RETAINER BOLTS UNTIL FAIRING IS INSTALLED.) (SEE DETAIL B.)

NOTE

THE MANUAL RELEASE LEVER MUST BE PLACED UNDER MANUAL RELEASE HOOK ON SHACKLE.

8 INSTALL AFT SECTION OF TANK FAIRING.

9 SECURE TANK RELEASE SHACKLE, WITH HEADS OF BOLTS ON OUTBOARD SIDE OF FAIRING.

10 INSTALL FAIRING SUCTION VENT CUTOUT COVER.

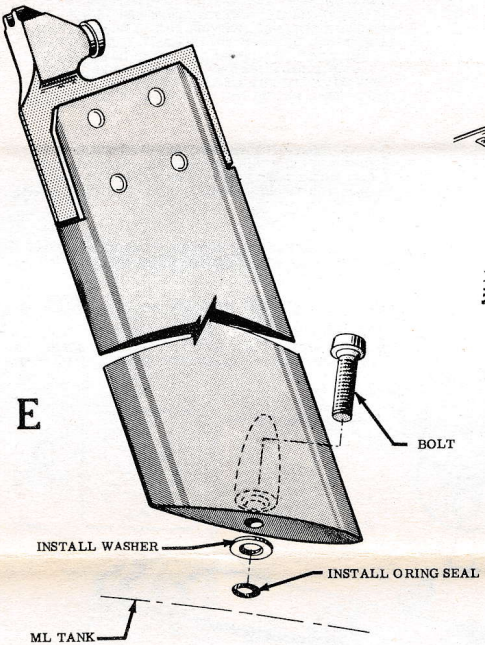
11 REMOVE TANK STRUT SCREWS, WASHERS AND LOCK-O-SEALS (OUTBOARD FRONT FOR BOTH WING TANKS), AND INSTALL SINGLE SWAY BRACE ON TANK, USING SPECIAL WASHER 170-48311 AND THE O RINGS REMOVED FROM LOCK-O-SEALS UNDER THE WASHER. AN934-6 O RINGS MAY BE SUBSTITUTED. LEAVE INTERNAL WRENCHING BOLT LOOSE UNTIL SWAY BRACE ASSEMBLY IS COMPLETE AND EARS ARE IN PERFECT ALIGNMENT.
FINAL TORQUE 180-220 INCH-POUNDS.

100 IMP. GALS.

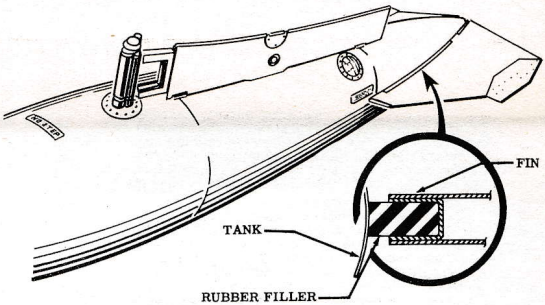
5E2-05-53A

Drop Tank Installation

Sheet 1 of 4



BRACE ASSEMBLY,
170-48306 - 1 (L. H.)
170-48306 - 2 (R. H.)



IF RUBBER FILLER BETWEEN FIN AND TANK IS NOT TIGHT AGAINST TANK, REMOVE FIN AND REPLACE RUBBER WITH SYNTHETIC SPONGE, 1/2" x 1 5/8" x 29" (AMS 3198C,) RCAF REF 32 C/12).

WARNING

USE SUITABLE WRENCH TO PREVENT UPPER END OF BRACE FROM TURNING WHEN THE SECURING BOLT AT LOWER END IS BEING TIGHTENED.

12 OPEN SHACKLE BY LIFTING MANUAL RELEASE ARM AND SPREADING SHACKLE JAWS: THEN LIFT TANK INTO POSITION UNDER WING, AND LOCK TANK SUPPORT POST IN RELEASE SHACKLE. (RELEASE SHACKLE IS LOCKED WHEN INDICATOR ARM CANNOT BE COMPLETELY DEPRESSED.

13 WITH TORQUE WRENCH ADAPTER T365-5 FOR 1-1/16 NUT TIGHTEN TANK SUPPORT POST TO A TORQUE OF 110 TO 120 FOOT-POUNDS (1350 TO 1440 INCH-POUNDS), MAKING SURE THE TANK TENSION POSTS ENGAGE WING PADS; THEN REMOVE TAPE HOLDING PADS ON WING.

NOTE

ABOVE TORQUE VALUES ARE FOR GREASED THREADS, THE TORQUE FOR DRY THREADS MUST NOT EXCEED 130 TO 140 FOOT-POUNDS (1560 TO 1680 INCH-POUNDS). WHEN TORQUE WRENCH ADAPTOR ST28064 IS USED, THE TORQUE WRENCH DRY THREAD EQUIVALENT DIAL READING WILL BE 100 TO 105 FOOT-POUNDS. THESE TORQUE VALUES MUST NOT BE EXCEEDED, OTHERWISE THE DROP TANK RELEASE WILL NOT OPERATE PROPERLY, AND SHACKLE MAY BE DAMAGED SERIOUSLY.

14 INSTALL UPPER SWAY BRACE FITTING BY ENGAGING DOWEL PIN INTO 1/4 HOLE IN LOWER WING SKIN; THEN TIGHTEN THE SWAY BRACE TANK FITTING INTERNAL WRENCHING BOLT AND THREAD A SAFETY WIRE THROUGH THE BOLT HEAD READY FOR LOCKING. (SEE DETAILS E AND F)

15 ENGAGE UPPER END OF SWAY BRACE INTO WING FITTING; INSTALL RETAINER SO THAT EARS OF SWAY BRACE AND RETAINER ENGAGE; TIGHTEN BOLT AND SAFETY WITH LOCKING WIRE. (SEE DETAIL F.)

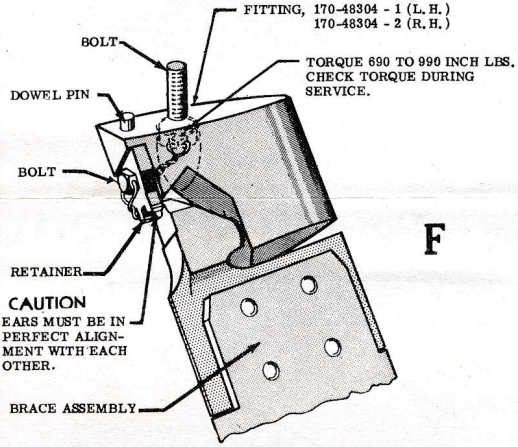
16 CONNECT TANK RELEASE SHACKLE ELECTRIC PLUG TO WING RECEPTACLE.

18 CLOSE ALL TANK OPENINGS AND APPLY 6 PSI AIR PRESSURE TO TANK THROUGH AIR PRESSURE INLET HOSE LINE. CHECK THAT NO LEAKAGE OCCURS, BY APPLYING LIQUID SOAP OVER THE ENTIRE TANK MATING SURFACES AND CONNECTIONS.

19 LUBRICATE PULLAWAY FITTINGS WITH PETROLATUM (SPECIFICATION 3-GP-665); THEN CONNECT FUEL AND AIR HOSES AND PULLAWAY FITTINGS TO WING FITTINGS. MAKE CERTAIN THAT THE PULLAWAY FITTING ENTER FULLY INTO THE WING FITTINGS AND THAT THE HOSES ARE EQUALIZED BETWEEN THE TANK AND WING FITTINGS.

20 INSTALL FRONT SECTION OF TANK FAIRING.

21 INSTALL SHACKLE FAIRING ACCESS COVER.

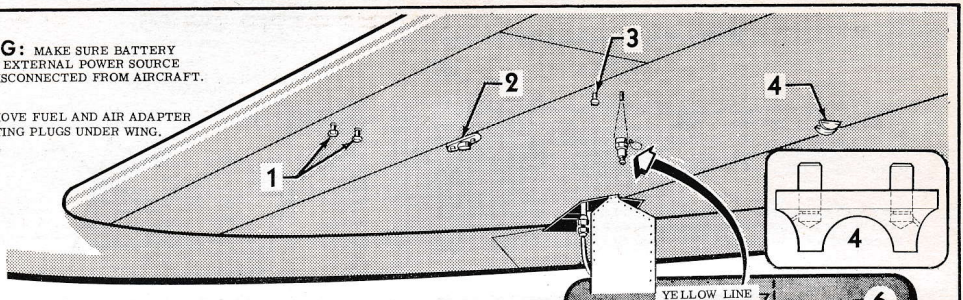


L. H. ASSEMBLY
LOOKING OUTBOARD FROM REAR.

100 IMP. GALS.

5E2-05-54

WARNING: MAKE SURE BATTERY AND EXTERNAL POWER SOURCE IS DISCONNECTED FROM AIRCRAFT.



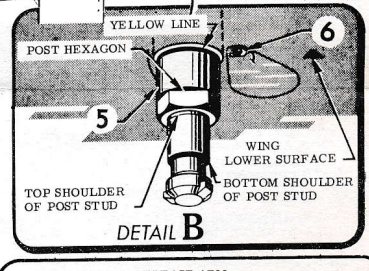
1 REMOVE FUEL AND AIR ADAPTER FITTING PLUGS UNDER WING.

2 REMOVE FORWARD ATTACHMENT POINT PLUGS UNDER WING: THEN INSTALL PINS IN ATTACHMENT POINTS.WITH MASKING TAPE SECURE TANK FORWARD POST PAD ON PINS.

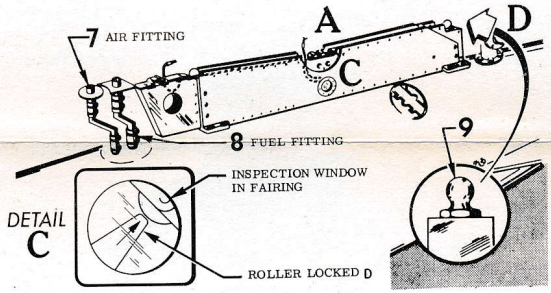
3 REMOVE SWAY BRACE HOLE PLUG IN WING.

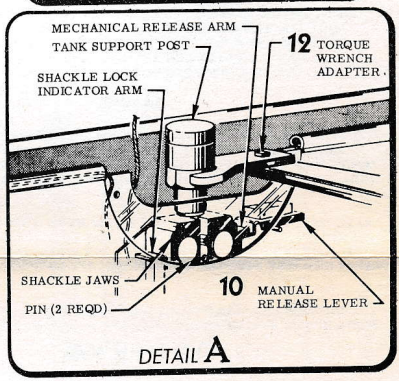
4 SECURE REAR TANK POST PAD IN WING SOCKET HOLES WITH MASKING TAPE

5 LUBRICATE TANK SUPPORT POST AND STUD THREADS WITH GREASE SPECIFICATION 3-GP-683A (MIL-G-3278.) TO BE SURE THREADS ARE FREE, SCREW STUD INTO SUPPORT POST BY HAND ONLY, TO STUD BOTTOM SHOULDER: THEN BACK OUT STUD UNTIL TOP SHOULDER IS FLUSH WITH BOTTOM OF POST HEXAGON. SCREW SUPPORT POST INTO WING, BY HAND ONLY, UNTIL TOP OF POST HEXAGON ENTERS LOWER SURFACE: THEN BACK OFF POST UNTILCOLORED LINE ON POST IS FLUSH WITH LOWER SURFACE.



NOTE: IF UNDUE RESISTANCE IS ENCOUNTERED WHEN RUNNING POST OR POST STUD ALL THE WAY IN, REMOVE AND CHANGE POST.





6 ON SHACKLES EQUIPPED WITH GROUND WIRE, BREAK SPLICE AND INSTALL LOOSE END UNDER POST COVER SCREW. (SEE DETAIL B)

7,8 INSTALL FUEL AND AIR HOSES AND FITTINGS ON TANK FITTINGS.

9 INSTALL BALL ON TANK AFT BEAM POST WITH LOWER SURFACE OF BALL HEXAGON FLUSH WITH TOP OF POST.

10 OPEN SHACKLE BY DEPRESSING MANUAL RELEASE LEVER AND SPREADING SHACKLE JAWS: THEN LIFT TANK INTO POSITION UNDER WING, AND LOCK TANK SUPPORT POST IN RELEASE SHACKLE JAWS.

NOTE: AFTER INSTALLING BUT BEFORE TORQUING EXTERNAL FUEL TANKS, PRESS THE INDICATOR ARM (PLUNGER) WHICH PROTRUDES FROM THE TOP OF THE SHACKLE OPPOSITE THE MANUAL LEVER, TO DETERMINE THE LOCKED POSITION. IF THE PLUNGER WILL BOTTOM ON THE HOUSING WITH FINGER PRESSURE THE MECHANISM IS NOT LOCKED. IF ONLY 1/8-INCH TRAVEL IS POSSIBLE, THE SHACKLE JAWS ARE SAFELY LOCKED. (SEE DETAIL C)

11 CONNECT TANK RELEASE SHACKLE ELECTRICAL PLUG TO WING RECEPTACLE.

12 USING TORQUE WRENCH ADAPTER T365-5, TIGHTEN TANK SUPPORT POST TO A TORQUE OF 135 TO 145 FOOT-POUNDS (1620 TO 1740 INCH-POUNDS), MAKING SURE TANK POSTS ENGAGE PADS ON WING. REMOVE TAPE HOLDING POST PADS ON WING, DISTRIBUTE SEALING COMPOUND (SPECIFICATION AN-C-128) AROUND JAWS, STUD, AND UPPER AREAS OF THE RELEASE MECHANISM TO CLOSE ALL OPENINGS THROUGH WHICH MOISTURE MIGHT ENTER THE MECHANISM.

NOTE: TO OBTAIN READING OF ACTUAL TORQUE APPLIED TO TANK SUPPORT POST, THE TORQUE WRENCH ADAPTER MUST BE INSTALLED AT RIGHT ANGLES TO THE TORQUE WRENCH SHANK. ANY OTHER RELATIONSHIP BETWEEN ADAPTER AND WRENCH WILL GIVE ERRONEOUS TORQUE READINGS.

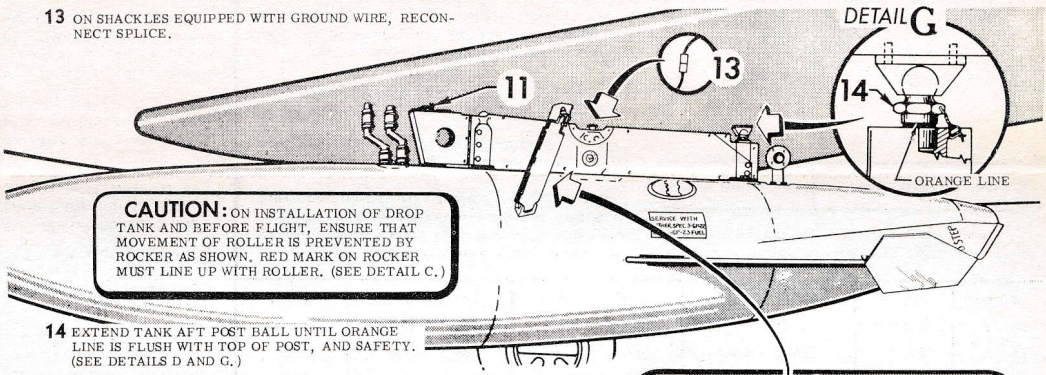
166.3 IMP. GALS.

5E2-05-51

Drop Tank Installation

Sheet 3 of 4

13 ON SHACKLES EQUIPPED WITH GROUND WIRE, RECONNECT SPLICE.



CAUTION: ON INSTALLATION OF DROP TANK AND BEFORE FLIGHT, ENSURE THAT MOVEMENT OF ROLLER IS PREVENTED BY ROCKER AS SHOWN. RED MARK ON ROCKER MUST LINE UP WITH ROLLER. (SEE DETAIL C.)

14 EXTEND TANK AFT POST BALL UNTIL ORANGE LINE IS FLUSH WITH TOP OF POST, AND SAFETY. (SEE DETAILS D AND G.)

15 REMOVE TANK INTERNAL STRUT SCREW, WASHER, AND LOCK-O-SEAL (ON OUTBOARD SIDE OF BOTH WING TANKS), AND INSTALL SWAY BRACE ON TANK, USING O RING FROM REMOVED LOCK-O-SEAL. (SEE DETAIL E.) LEAVE BOLT LOOSE.

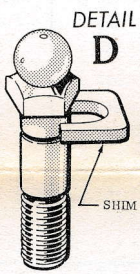
16 LOCATE TANK SWAY BRACE FITTING BY ENGAGING DOWEL PIN INTO LOWER WING SKIN: THEN TORQUE FITTING INTERNAL WRENCHING BOLT.

17 ENGAGE SWAY BRACE INTO FITTING AND INSTALL RETAINER SO THAT LUGS OF SWAY BRACE AND RETAINER ENGAGE: THEN TORQUE AND SAFETY SWAY BRACE-TO-WING INTERNAL WRENCHING BOLT TO RETAINER BOLT. (SEE DETAIL F.)

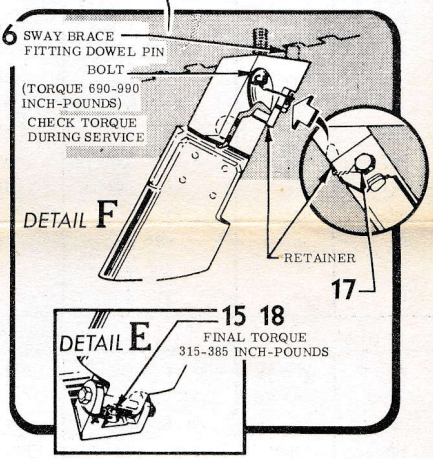
18 TIGHTEN SWAY BRACE-TO-TANK BOLT, AND SAFETY.

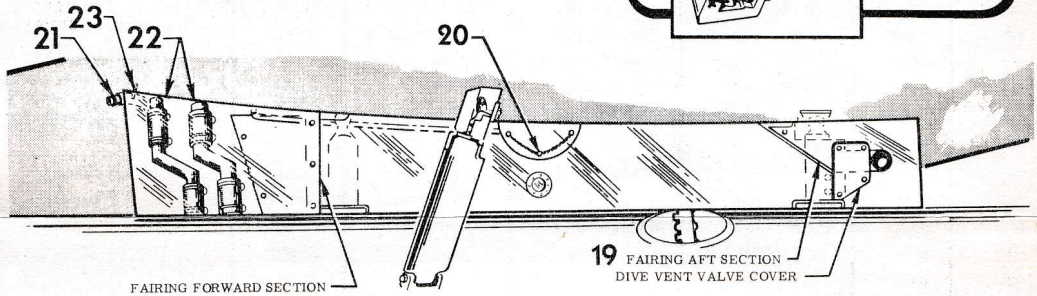
CAUTION: EARS MUST BE IN PERFECT ALIGNMENT WITH EACH OTHER.

19 INSTALL AFT SECTION OF TANK FAIRING: THEN INSTALL FAIRING DIVE VENT VALVE CUTOUT COVER.



IF THREADED LENGTH IS 9/16 IN., SHIM MUST BE ADDED UNDER HEX. IF THREADED LENGTH IS 13/16 IN. NO SHIM IS REQUIRED.





20 INSTALL TANK BEAM COVER AND SAFETY.

21 CLOSE ALL TANK OPENINGS, AND APPLY 8 PSI AIR PRESSURE TO TANK THROUGH AIR PRESSURE INLET LINE. CHECK THAT NO AIR LEAKAGE OCCURS, BY APPLYING LIQUID SOAP OVER ENTIRE TANK MATING SURFACES AND CONNECTIONS.

22 LUBRICATE PULLAWAY FITTINGS WITH PETROLATUM (SPECIFICATION 3-GP-665): THEN CONNECT FUEL AND AIR HOSES AND PULLAWAY FITTINGS TO WING FITTINGS. MAKE SURE THAT PULLAWAY FITTINGS ENTER FULLY INTO WING FITTINGS AND THAT HOSES ARE EQUALIZED BETWEEN TANK AND WING FITTINGS. MAKE SURE THAT CLAMPS WILL CLEAR FAIRING WHEN INSTALLED.

23 EXTEND FAIRING FORWARD SUPPORT PIN FROM WING 3/8 INCH.

24 INSTALL FRONT SECTION OF TANK FAIRING. (USE CORRECT FAIRING.)

166.3 IMP. GALS.

5E2-05-52 B

WING OUTER PANEL TO CENTRE SECTION

Wing attaching bolts:

Top skin: 650 inch-pounds, by head. Bottom skin: 850 inch-pounds, by head.

Front spar Bolts:

Top bolt: 900 inch-pounds, by nut. 1000 inch-pounds, by head. Middle 3 bolts: 650 inch-pounds, by nut. Bottom 2 bolts: 1250 inch-pounds, by head.

Rear spar bolts:

Top 4 bolts: 1000 inch-pounds, by head. Bottom 2 bolts: 1250 inch-pounds, by head.

AILERON HINGE BOLTS:

15 to 20 inch-pounds.

STABILIZER Y BOLTS (VERTICAL)

1300 to 2160 inch-pounds.

STABILIZER TO FUSELAGE HINGE BOLTS (HORIZONTAL)

80 to 120 inch-pounds.

VERTICAL STABILIZER ATTACHING BOLTS

Front spar bolts:

990 to 1140 inch-pounds.

Rear spar bolts:

600 to 800 inch-pounds.

Front to rear fuselage Attaching bolts:

160-190 inch pounds.

ENGINE SPECIAL TORQUES

1 Throttle bellcrank bracket at front flange of compressor casing: 100 - 140 inch-pounds.

2 Oil return line bracket, front flange of compressor casing: 160 - 190 inch-pounds.

3 Engine harness clips, front flange: 160 - 190 inch-pounds. Bosses: 70 - 90 inch-pounds.

4 Leads to starter terminal block: 50 - 70 inch-pounds.

5 Leads to generator terminal block - large nuts 50 - 70 inch-pounds, small nut 15 - 20 inch-pounds.

TORQUE VALUES IN INCH-POUNDS

Bolt, Stud, or Screw Size	Standard Nuts, Bolts, and Screws: Tension-Type Nuts AN310 and AN365 (40,000 psi in bolt)	Standard Nuts, Bolts, and Screws: Shear-Type Nuts AN320 and AN364 (60% of column 2)	High-Strength Nuts, Bolts, and Screws: Any Nut Except Shear Type	Maximum Allowable Tightening Torque: Tension-Type AN310, AN365 (90,000 psi) in bolt	Maximum Allowable Tightening Torque: Shear-Type AN320, AN364 60% of column 5
1	2	3	4	5	6
FINE THREAD					
8-36	12 - 15	7 - 9	15 - 18	20	12
10-32	20 - 25	12 - 15	25 - 35	40	25
1/4-28	50 - 70	30 - 40	70 - 90	100	60
5/16-24	100 - 140	60 - 85	140 - 203	225	140
3/8-24	160 - 190	95 - 110	190 - 351	390	240
7/16-20	450 - 500	270 - 300	500 - 756	840	500
1/2-20	480 - 690	290 - 410	690 - 990	1,100	660
9/16-18	800 - 1,000	480 - 600	1,000 - 1,440	1,600	960
5/8-18	1,100 - 1,300	660 - 780	1,300 - 2,160	2,400	1,400
3/4-16	2,300 - 2,500	1,300 - 1,500	2,500 - 4,500	5,000	3,000
7/8-14	2,500 - 3,000	1,500 - 1,800	3,000 - 6,300	7,000	4,200
1-14	3,700 - 5,500	2,200 - 3,300	5,500 - 9,000	10,000	6,000
1 1/8-12	5,000 - 7,000	3,000 - 4,200	7,000 - 13,500	15,000	9,000
1 1/4-12	9,000 - 11,000	5,400 - 6,600	11,000 - 22,500	25,000	15,000
COARSE THREAD					
8-32	12 - 15	7 - 9	15 - 18	20	12
10-24	20 - 25	12 - 15	25 - 35	35	21
1/4-20	40 - 50	25 - 30	50 - 68	75	45
5/16-18	80 - 90	48 - 55	90 - 144	160	100
3/8-16	160 - 185	95 - 110	185 - 248	275	170
7/16-14	235 - 255	140 - 155	255 - 428	475	280
1/2-13	400 - 480	240 - 290	480 - 792	880	520
9/16-12	500 - 700	300 - 420	700 - 990	1,100	650
5/8-11	700 - 900	420 - 540	900 - 1,350	1,500	900
3/4-10	1,150 - 1,600	700 - 950	1,600 - 2,250	2,500	1,500
7/8-9	2,200 - 3,000	1,300 - 1,800	3,000 - 4,140	4,600	2,700
1-8	3,700 - 5,000	2,200 - 3,000	5,000 - 6,840	7,600	4,500
1 1/8-8	5,500 - 6,500	3,300 - 4,000	6,500 - 10,800	12,000	7,200
1 1/4-8	6,500 - 8,000	4,000 - 5,000	8,000 - 14,000	16,000	10,000

These values are for dry (lubricant free) cadmium plated steel bolts and nuts. Corrosion resistant bolts and nuts must be used with Anti-Sieze compound. Use table 3.

Where torquing MUST be done through bolt head, use high value in tables.

Where shear nuts are used, use Table 3 regardless of bolt type.

Where adapter is used on torque wrench, adapter must be at right angles to wrench. If adapter lengthens arm, recalculate values.

For joints sealed with synthetic rubber sheet or gasket material, use this table:

Bolt size	Torque (Inch-pounds)
10	20-25
1/4	25-60
5/16	35-60

COMPOUNDS FOR LUBRICATION AND SEALING OF THREADED FITTINGS

Type of Installation		Thread Compound Specification	
		Straight Threads	Tapered Threads
Engine Fuel and Oil Pressure Instruments (Transmitter Type)	A-1 Type Transmitter	Gasoila Varnish	Gasoila Varnish
	Autosyn Type Transmitter	MIL-L-6032	MIL-L-6032
Fuel		MIL-L-6032	MIL-L-6032
Hot Air		Wingo RB1	Wingo RB1
Hydraulic		AN-P-51 or MIL-O-5606	3-GP-801
Pneumatic		MIL-L-4343	MIL-L-4343
Oxygen - To prevent seizure, not for sealing.		MIL-C-5542	MIL-C-5542
All other Systems not covered above		3-GP-801	3-GP-801

Apply sparingly to male threads only, but not the first two male threads to engage the female threads.
Absolutely NO compound may remain where it might enter the system
Gaskets in Fuel Lines - Seal with MIL-L-6032 (34A/167)

TORQUE VALUES FOR FITTINGS WITH TAPERED (PIPE) THREADS

Nominal Pipe Size	Minimum, Inch-Pounds	Maximum, Inch-Pounds
1/8	40	300
1/4	60	600
3/8	75	700
1/2	100	900
3/4	300	1600
1	400	2200
1 1/4	500	2500

Not to be used for Oxygen System.

TORQUING

1 All plumbing line fittings, except in the oxygen system, shall be torqued to the values specified in Table of Standard Torque Values (1 or 2) according to the type of fitting involved. These values shall apply regardless of the fitting or nut material.

2 Fittings in the oxygen system shall be torqued as follows:

a. Flared tube fittings on 5/16" lines. — One half turn past the point of hand tightness for new lines: one third turn similarly for used lines.

b. Soldered fittings on 3/16" lines. — 25-30 in. /lb. If leakage occurs, an absolute maximum of 40 in. /lb may be used after installation.

PLUMBING CONNECTION TORQUE CHART - STRAIGHT THREADS

Outside Diameter of Tube in inches	Hose Assembly Size	Thread Size of Hose Fittings	52S-O Aluminum Alloy Tubing		MIL-T-6845 and AMS-5566 Stainless Steel Tubing		Flexible Hose Assemblies and 61S-T6 Aluminum Alloy Tubing	
			Minimum Inch-pounds	Maximum Inch-pounds	Minimum Inch-pounds	Maximum Inch-pounds	Minimum Inch-pounds	Maximum Inch-pounds
1/8	-2	5/16-24	20	25				
3/16	-3	3/8-24	25	35	90	140	30	70
1/4	-4	7/16-20	40	65	135	185	70	120
5/16	-5	1/2-20	60	80	180	230	70	120
3/8	-6	9/16-18	75	125	270	345	130	180
1/2	-8	3/4-16	150	250	450	525	300	400
5/8	-10	7/8-14	200	350	650	750	430	550
3/4	-12	1 1/16-12	300	500	900	1100	650	800
1	-16	1 5/16-12	500	700	1200	1400	900	1100
1 1/4	-20	1 5/8-12	600	900	1500	1800	1200	1450
1 1/2	-24	1 7/8-12	600	900	2000	2300	1550	1850
1 3/4	-28	2 1/4-12	700	1000	2600	2900	2000	2350
2	-32	2 1/2-12	800	1100	3200	3600	2500	2900

Hose Clamps - Torque 25 Inch-Pounds.

	UNIVERSAL HEAD	ROUND HEAD	FLUSH HEAD	HEAD MARKING
AL. ALLOY A17 ST RIVET USED AS RECEIVED	AN470AD		AN426AD	DIMPLE
AL ALLOY 24 ST RIVET MUST BE SOLUTION HEAT-TREATED AND QUENCHED; THEN EITHER DRIVEN WITHIN 20 MINUTES OR REFRIGERATED AND DRIVEN WITHIN 20 MINUTES OF REMOVAL FROM FREEZER.	AN470DD		AN426DD	RAISED DOUBLE DASH
AL ALLOY 56S RIVET. USED WHERE RIVET ENGAGES MAGNESIUM. USED AS RECEIVED.	AN470B		AN426B	RAISED CROSS AND DYED RED OR ORANGE
ALUMINUM 2S RIVET. USED AS RECEIVED.	AN470A		AN426A	PLAIN AND DYED BLACK
MILD STEEL RIVET, CAD-PLATED, FOR CAD-PLATED STEEL.		AN435	AN427	RECESSED TRIANGLE
MONEL RIVET, FOR CORROSION RESISTANT STEEL ONLY.		AN435M	AN427M	PLAIN

EXAMPLES OF BOLT AND SCREW CODING

AN6C10...

3/8 - 24 corrosion resisting steel bolt, 1-5/64 inch long, 7/16 grip, shank drilled.

AN509-10R12...

10 - 32 recessed head steel screw, 25/32 inch long.

NAS144 ADH-25...

1/4 - 28 bolt, int. wrenching, 1-9/16 inch long, drilled head, drilled shank.

EXAMPLES OF RIVET CODING

AN426 B3-9...

Solid rivet, 100° c/s head, 56S aluminum alloy, 5/16 inch diam. 5/8 inch long.

AN426 AD10-10...

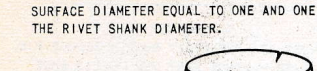
Solid rivet, 100° c/s head, A17ST aluminum alloy, 5/16 inch diam. 5/8 inch long.

AN470 A2-12...

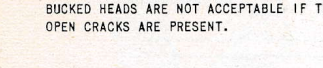
Solid rivet, universal head, 2S aluminum 1/16 inch diam. 3/4 inch long.

MATERIAL OR TYPE	MARKING	TYPICAL PART NOS.
STEEL - X		AN3 TO AN20
CORROSION-RESISTANT STEEL - DASH		AN3 TO AN20
AL. ALLOY - DASHES		AN3 TO AN20
CLOSE TOLERANCE - TRIANGLE		AN173 TO AN186
CLOSE TOLERANCE - INTERNAL WRENCHING PART NO. AND MAKER'S MARK	NAS147 -20	NAS144 TO NAS158
CORROSION-RESISTANT STEEL - DASHES		
STEEL - X		AN509. 100° C/S HEAD MACHINE SCREWS. HEADS SLOTTED, PHILLIPS OR REED & PRINCE. (USE PHILLIPS ON SABRE.)
BRONZE - DOUBLE DASHES		
HIGH STRENGH BOLT DIMPLE IN TRIANGLE.		NAS333 TO 340° 100° C/S. HEX SOCKET HEAD. ALSO PHILLIPS AND R & P IN SMALLER SIZES. HEX IS FOR HOLDING, NOT FOR TORQUING.
STANDARD AN BOLT REWORKED. NORMAL MARKING SURROUNDED BY RING.		ORIGINAL FINISH RE-APPLIED.

THE UPSET RIVET HEAD SHALL HAVE A MINIMUM CRACK-FREE SURFACE DIAMETER EQUAL TO ONE AND ONE TENTH (1.1) TIMES THE RIVET SHANK DIAMETER.

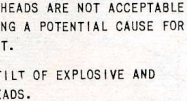


BUCKED HEADS ARE NOT ACCEPTABLE IF THREE (3) OR MORE OPEN CRACKS ARE PRESENT.

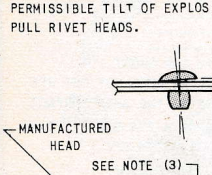


BUCKED HEADS ARE NOT ACCEPTABLE IF CRACKS INTERSECT, PRODUCING A POTENTIAL CAUSE FOR A PORTION OF THE HEAD TO CHIP OUT.

PERMISSIBLE TILT OF EXPLOSIVE AND PULL RIVET HEADS.



RIVET SIZE	X MAX.
1/8	.004
5/32	.006
3/16	.008

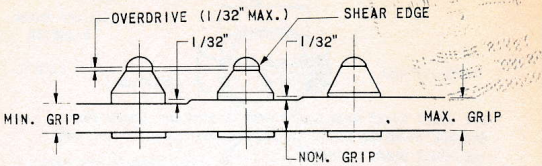


RIVET SIZE	A DIA.		H HEIGHT	
	MIN.(1)	MAX.(2)	MIN.(3)	MAX. (1) (2)
3/32	.122	.157	.031	.063
1/8	.163	.208	.042	.083
5/32	.203	.260	.052	.104
3/16	.243	.312	.062	.125
1/4	.325	.417	.083	.167

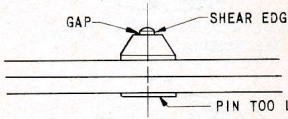
NOTES: **1** THESE VALUES APPLY TO ALL RIVET APPLICATIONS. WHERE RIVETS JOIN PLASTIC PARTS AND THE MINIMUM ACCEPTABLE UPSET WILL HELP PREVENT CRACKING OF THE MATERIAL, DIMENSIONS APPROACHING THESE LIMITS ARE RECOMMENDED.

2 MAXIMUM VALUES REPRESENT DESIRABLE UPPER LIMITS AND SHOULD NOT BE USED FOR INSPECTION PURPOSES.

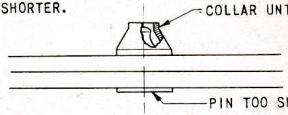
3 THIS COLUMN IN TABLE ALSO APPLIES TO THE MINIMUM ACCEPTABLE HEIGHT OF THE MANUFACTURED HEAD OF AN AN470 AFTER BEING DRIVEN WITH FLAT SET.



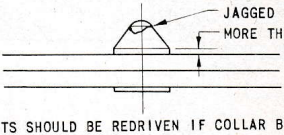
HI-SHEAR RIVET COLLARS MUST BE COMPLETELY SWAGED AROUND PIN. A SLIGHT "OVERDRIVE" OF 1/32" MAXIMUM PAST THE "SHEAR EDGE" IS RECOMMENDED, EXCEPT UNDER MAXIMUM GRIP CONDITIONS.



HI-SHEAR RIVETS ARE NOT ACCEPTABLE IF A GAP EXISTS BETWEEN COLLAR AND PIN UNDER THE "SHEAR EDGE". THE RIVET SHOULD BE REMOVED AND REPLACED BY ANOTHER PIN THE SAME LENGTH USING A WASHER (1/32" THICK) UNDER THE COLLAR OR ANOTHER PIN ONE (1) DASH NUMBER SHORTER.

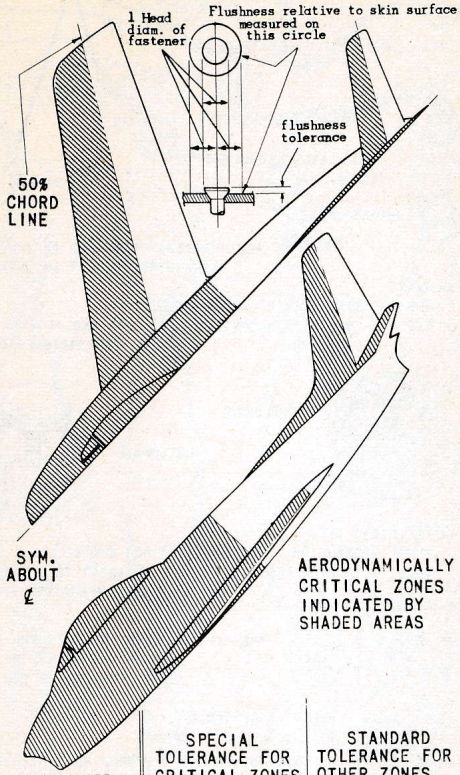


HI-SHEAR RIVETS ARE NOT ACCEPTABLE IF COLLAR DOES NOT CUT OFF AND THE DRIVING TOOL IS IN DANGER OF MARRING THE SKIN SURFACE THE RIVET SHOULD BE REMOVED AND REPLACED BY A PIN ONE (1) DASH NUMBER LONGER, WITH OR WITHOUT A WASHER (1/32" THICK).



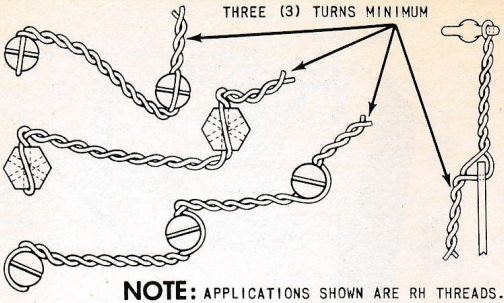
HI-SHEAR RIVETS SHOULD BE REDRIVEN IF COLLAR BREAKS OFF ABOVE "SHEAR EDGE" AND THE THICKNESS OF THE UNFORMED PORTION AT THE COLLAR BASE EXCEEDS 1/16".

HI-SHEAR RIVETS ARE NOT REQUIRED TO CLOSE GAPS BETWEEN ATTACHING PARTS. SUBSTITUTION OF A STANDARD AN BOLT SHOULD NOT BE MADE UNLESS THE GAP IS CAPABLE OF BEING CLOSED WITH STANDARD TORQUE LIMIT APPLIED TO THE BOLT.


1 Head diam. of fastener
Flushness relative to skin surface measured on this circle
flushness tolerance
50% CHORD LINE
SYM. ABOUT ℄
AERODYNAMICALLY CRITICAL ZONES INDICATED BY SHADED AREAS

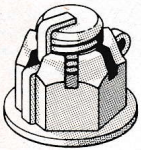
FASTENER	SPECIAL TOLERANCE FOR CRITICAL ZONES	STANDARD TOLERANCE FOR OTHER ZONES
Screw	.005 Above .002 Below	.010 Above .002 Below
Hi-Shear Rivet	.005 Above .000 Below	.010 Above .000 Below
Flush-Head Rivet	.002 Above .000 Below	.010 Above .000 Below

Flushness Tolerances of Flush-head Fasteners



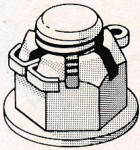
NOTE: APPLICATIONS SHOWN ARE RH THREADS. WIRE OPPOSITE FOR LH THREADS.

LOCKWIRE-
AN995-F ZINC-COATED CARBON STEEL
AN995-N INCONEL ADJACENT TO COMPASSES AND IN HIGH TEMPERATURE AREAS.

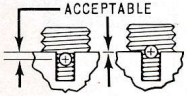


PREFERRED

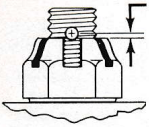
OPTIONAL



COTTER PINS-
AN380 CADMIUM OR ZINC-PLATED CARBON STEEL.
AN381 CORROSION-RESISTANT STEEL ADJACENT TO COMPASSES AND IN HIGH TEMPERATURE AREAS.

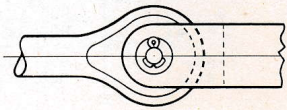


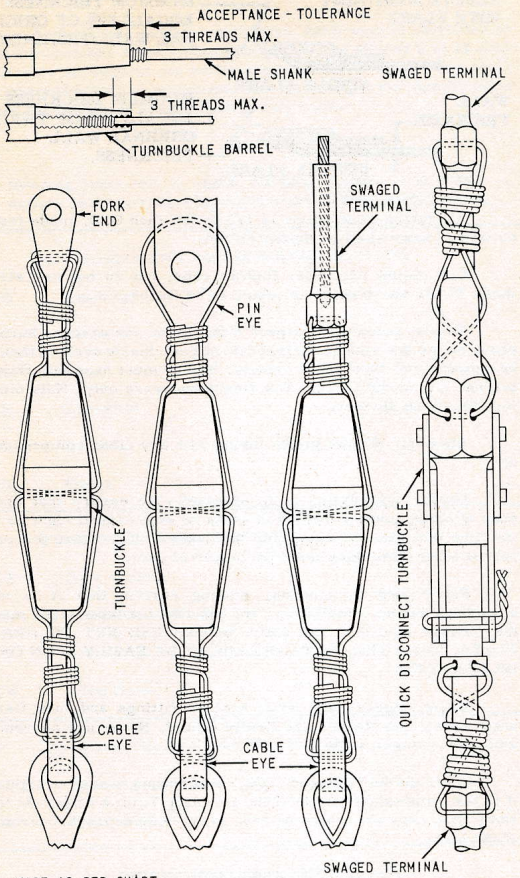
THE CENTER OF THE HOLE IN THE BOLT MUST NOT EXTEND BEYOND THE END OF THE NUT.



WITH NON-SPLIT-PINNED NUTS, AT LEAST ONE FULL THREAD OF THE BOLT SHOULD EXTEND THROUGH THE NUT.

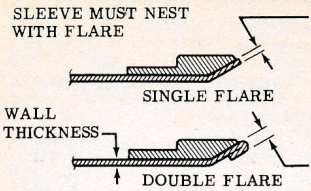
FLAT HEAD PINS





WIRE AS PER CHART-

CABLE SIZE	STANDARD USE	HIGH TEMP. OR NON-MAGNETIC USE
LOCK HOLE LESS THAN .082 FOR TWO WIRES	AN995-F32	AN995-N32
1/8 INCH & LESS	AN995-F41	AN995-N40
GREATER THAN 1/8 INCH	AN995-F47	AN995-N51


SLEEVE MUST NEST WITH FLARE
MINIMUM THICKNESS EQUALS 80% OF ORIGINAL WALL THICKNESS.
SINGLE FLARE
WALL THICKNESS
MINIMUM THICKNESS EQUALS 80% OF TWICE ORIGINAL WALL THICKNESS.
DOUBLE FLARE

All tubing assemblies of 1/4 to 3/8 inch O. D. made from aluminum alloy shall be double flared.

Cut tubing squarely. Deburr ends, but do not use steel wool. Break sharp edges of tubing to be flared.

Before assembly, inspect tube flares for cracks, burrs, sharp edges and concentricity with sleeves. Inside surface should be smooth and free from defects. Sleeve must nest with flare, and not jam at the radius. Use finger pressure only. Nuts must turn freely on sleeves.

Blow out all dirt inside tubing with dry clean compressed air.

During installation it is absolutely necessary that open ends of tubing and all fittings on units be kept capped right up to the time they are connected into the system. If they are disconnected at any time they must be capped at once.

Place tube in position, making certain that it is not scratched during installation, and see that the tube flares meet the fittings squarely and fully. NEVER USE NUT TO DRAW FLARE TO FITTING AS FLARE MIGHT BE EASILY SPUN OFF OR DAMAGED.

Using fingers only, start nuts on fittings and turn flare until flares and sleeves are firmly seated. Never use a wrench until nut is finger-tight.

After the nut is finger-tight, use a torque wrench to tighten it to the torque shown in the Tube Coupling Torque Chart. At the same time use a wrench on the hex. of the body to prevent turning of the body.

ASSEMBLING FLEXIBLE TUBING

The mandrel, nipple and inner tube shall be completely and thoroughly lubricated with S. A. E. 50 oil during assembly. The nipple shall be screwed into the hose at a slow rate and never forced. The rubber liner of the hose shall be just bottomed in the nipple, not jammed so that the rubber is made to swell.

Flush the completed assembly with hydraulic oil.

ELECTRICAL AND ELECTRONIC WIRING IDENTIFICATION

To facilitate wiring installation, each wire is identified by a letter-number combination stamped on the wire at 6 to 18-inch intervals throughout its entire length. This code does not apply to internal wiring of equipment. The following is the identification code for wiring as used in Sabre 5 aircraft.

NOTE

Heading from left to right, the first number is to differentiate between cables having the same cable identification.

A	ALL ARMAMENT AND BOMBING CIRCUITS
AB	Bombing
AC	Camera
AG	Guns
AK	Chemical
AR	Rockets
AS	Sights
C	FLIGHT CONTROL CIRCUITS
CB	Dive brakes
CS	Alternate hydraulic
CT	Trim tabs
CW	Wing flaps
D	DE-ICING OR ANTI-ICING CIRCUITS
DD	De-icing control
DF	Pitot heaters
E	ENGINE INSTRUMENT CIRCUITS
ED	Fuel flow
EF	Fuel quantity
EG	Oil pressure
EP	Oil temperature (main oil)

ES	Tachometer
EU	Fuel pressure
EV	Hydraulic pressure
EY	Oil temperature (Centre bearing scavenge)
EZ	Exhaust temperature
F	FLIGHT INSTRUMENT CIRCUITS
FB	Turn and bank indicator
FH	Attitude gyro
FR	Gyro compass
G	LANDING GEAR CIRCUITS
GA	Actuator and retraction
GC	Wheel steering
H	HEATING AND VENTILATING CIRCUITS
HC	Cabin heater
HG	Gun heater
HV	Ventilation control
J	IGNITION CIRCUITS
JD	Ignition vibrator
K	ENGINE CONTROL CIRCUITS
KS	Starter
L	LIGHTING CIRCUITS
LE	Extension
LJ	Instrument
LL	Landing
LN	Navigation

M	MISCELLANEOUS
MR	Enclosure operation release, locks, etc.
MT	Target tow

N GROUND NETWORK WIRING

Any wire that completes the circuit to the ground network from an equipment item is designated with the letter N. In explanation, it may be said that any wire with an N circuit function letter could be connected to the aircraft ground network without malfunctioning of the circuit.

NA	Ground, armament
NC	Ground, flight control
ND	Ground, de-icing or anti-icing
NE	Ground, engine instruments
NF	Ground, flight instruments
NG	Ground, landing gear
NH	Ground, heating and ventilating
NJ	Ground, ignition
NK	Ground, engine control
NL	Ground, lighting
NM	Ground, miscellaneous
NP	Ground, power
NQ	Ground, fuel and oil
NR	Ground, radio navigational and communications equipment
NS	Ground, radio operated equipment
NV	Ground, inverter
NW	Ground, warning devices

P POWER

All wiring of battery, generator, voltage regulator, alternator field, field supply, rectifier output, generator load equalizer resistor and their controls, etc., has the P classification. All d.c. power wiring for more than one circuit is identified by the letter P with no additional circuit designation letter. This includes feeders from reverse-current relays to busses, from batteries to busses, etc. All d.c. feeders or d.c. power wiring up to the protector for an individual circuit (other than the ground network) is identified by two letters; the letter P and a circuit designation letter as shown in the following:

PA	Power, armament
PC	Power, flight controls
PD	Power, de-icing or anti-icing
PG	Power, landing gear
PH	Power, heating and ventilating
PP	Power, generator control, battery control
PQ	Power, fuel and oil
PV	Power, inverter

Q FUEL AND OIL

QB	Fuel booster pump motor
QF	Fuel transfer pump motor and control
QT	Throttle control, fuel pump motor

R RADIO NAVIGATIONAL AND COMMUNICATIONS EQUIPMENT

RN	Radio navigation
RV	VHF radio
RW	VHF radio

S RADAR OPERATED EQUIPMENT

SG	Gun laying radar
SX	Recognition radar

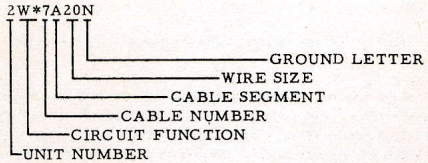
V	INVERTER CONTROL
VX	Inverter a. c. control

W	WARNING DEVICES
WA	Warning, armament
WD	Warning, windshield anti-ice overheat & ice detector
WF	Warning, flight instrument
WG	Warning, landing gear
WH	Warning, heat, vent & pressurization
WM	Warning, miscellaneous
WP	Warning, power
WV	Warning, inverter
WW	Warning, oxygen

X A.C. POWER

All a. c. feeders or a. c. power wiring up to an individual circuit (such as protectors) other than the ground network is designated by the letter X. All external wiring of alternators, inverters and control equipment has the X classification.

XA	A-phase of the three-phase power
XB	B-phase of the three-phase power
XC	C-phase of the three-phase power
XN	Neutral or ground wire of three-phase power
XV	Inverter (single-phase)



* May consist of 1 or 2 letters.

THE SABRE 6 AIRCRAFT IS BASICALLY THE SAME AS THE SABRE 5, EXCEPT FOR CHANGES DUE TO THE INCORPORATION OF THE ORENDA 14 ENGINE IN REPLACEMENT OF THE ORENDA 10 ENGINE, AND AN IMPROVEMENT OF THE EMERGENCY ESCAPE SYSTEM.

FOR FURTHER INFORMATION, SEE EO 05-5E-2, EO 10B-10B-2, AND EO 10B-10BA-2. CHANGES ARE AS FOLLOWS:

Effectivity Aircraft 23371 and subsequent

(a) Orenda 14 replaces Orenda 10 engine.

(b) Waste air duct elbow is modified to suit new position of engine flange. Heat and vent duct and hydraulic lines are re-routed to give additional clearance for new engine.

(c) The jet pipe is modified to suit the new engine. A jet pipe temperature limiter with thermocouples and harness is installed. Alternating current is fed to the jet pipe temperature limiter and a fuse is added on the single phase inverter circuit breaker panel in the radar bay. Wiring is added to the engine disconnect and the panel. An emergency override is incorporated on the throttle control to cut out the jet pipe temperature limiter.

(d) The throttle control quadrant is changed to compensate for the different operating range

(e) A motor-driven actuator replaces the emergency fuel solenoid, and a new control switch with wiring from the engine disconnect is incorporated.

(f) The oil temperature indicator system is deleted.

(g) The canopy and seat ejection systems are improved by incorporation of gas initiated seat catapult and canopy remover. Cables, links and sear systems are replaced by M-3 gas initiators with flexible high-pressure hoses. The M-5 catapult replaces the M-1A1 catapult, and the M-1A2 Canopy remover with the M-1 exactor replaces the M-1 remover.

(h) Two levers are installed on the radar equipment access door to facilitate opening the door without causing damage to the rubber seal which prevents water from entering into the radar equipment.

(j) The outer wing fuel cell interconnectors are modified to ensure a more positive seal between the fuel cells and the interconnectors.

(k) The flap control lever has been redesigned. The lever is straightened and a smaller knob is attached to give an increased clearance between the throttle lever and the flap control lever.

(l) The ARC-3 VHF radio with 24 channels replaces the 8 channel type. The units are interchangeable. The new radio is designed to provide for emergency operation of the transmitter following ejection of the canopy.

Effectivity Aircraft 23431 and subsequent

(a) The target tow with release mechanism has been deleted.

(b) The removeable portion of the extended leading edge is modified to prevent the possibility of loss during flight and to standardize for interchangeability.

Effectivity Aircraft 23491 and subsequent

(a) The ice detector system is deleted. Blanking plates cover existing openings.

(b) The improved D-2 oxygen regulator replaces the D-1 regulator. The new type oxygen regulator requires a higher cabin altitude for positive pressure.

(c) The S-4 manual pneumatic guncharger is installed to obtain a more reliable performance.

(d) A camera is installed with the gun sight. A redesigned instrument shroud is incorporated with a harness suitable for connecting to the camera. The standby compass and the clock are interchanged to reduce excessive compass deviation due to the camera installation.

Absolute Zero = -273° C. = -459.4° F					
Deg.C	°F.or °C	Deg. F	Deg. C	°F. or °C	Deg. F
-17.8	0	32.0	-3.3	26	78.8
-17.2	1	33.8	-2.8	27	80.6
-16.7	2	35.6	-2.2	28	82.4
-16.1	3	37.4	-1.7	29	84.2
-15.6	4	39.2	-1.1	30	86.0
-15.0	5	41.0	-0.6	31	87.8
-14.4	6	42.8	0.0	32	89.6
-13.9	7	44.6	0.6	33	91.4
-13.3	8	46.4	1.1	34	93.2
-12.8	9	48.2	1.7	35	95.0
-12.2	10	50.0	2.2	36	96.8
-11.7	11	51.8	2.8	37	98.6
-11.1	12	53.6	3.3	38	100.4
-10.6	13	55.4	3.9	39	102.2
-10.0	14	57.2	4.4	40	104.0
-9.4	15	59.0	5.0	41	105.8
-8.9	16	60.8	5.6	42	107.6
-8.3	17	62.6	6.1	43	109.4
-7.8	18	64.4	6.7	44	111.2
-7.2	19	66.2	7.2	45	113.0
-6.7	20	68.0	7.8	46	114.8
-6.1	21	69.8	8.3	47	116.6
-5.6	22	71.6	8.9	48	118.4
-5.0	23	73.4	9.4	49	120.2
-4.4	24	75.2	10.0	50	122.0
-3.9	25	77.0			

Temperature Equivalents

Absolute Zero = -273°C. = -459.4°F					
Deg. C	°F or °C	Deg. F	Deg. C	°F or °C	Deg. F
10.6	51	123.8	24.4	76	168.8
11.1	52	125.6	25.0	77	170.6
11.7	53	127.4	25.6	78	172.4
12.2	54	129.2	26.1	79	174.2
12.8	55	131.0	26.7	80	176.0
13.3	56	132.8	27.2	81	177.8
13.9	57	134.6	27.8	82	179.6
14.4	58	136.4	28.3	83	181.4
15.0	59	138.2	28.9	84	183.2
15.6	60	140.0	29.4	85	185.0
16.1	61	141.8	30.0	86	186.8
16.7	62	143.6	30.6	87	188.6
17.2	63	145.4	31.1	88	190.4
17.8	64	147.2	31.7	89	192.2
18.3	65	149.0	32.2	90	194.0
18.9	66	150.8	32.8	91	195.8
19.4	67	152.6	33.3	92.	197.6
20.0	68	154.4	33.9	93	199.4
20.6	69	156.2	34.4	94	201.2
21.1	70	158.0	35.0	95	203.0
21.7	71	159.8	35.6	96	204.8
22.2	72	161.6	36.1	97	206.6
22.8	73	163.4	36.7	98	208.4
23.3	74	165.2	37.2	99	210.2
23.9	75	167.0	37.8	100	212.0

Absolute Zero = -273°C = -459.4°F					
Deg.C	°F or °C	Deg. F	Deg.C	°F or °C	Deg. F
38.3	101	213.8	52.2	126	258.8
38.9	102	215.6	52.8	127	260.6
39.4	103	217.4	53.3	128	262.4
40.0	104	219.2	53.9	129	264.2
40.6	105	221.0	54.4	130	266.0
41.1	106	222.8	55.0	131	267.8
41.7	107	224.6	55.6	132	269.6
42.2	108	226.4	56.1	133	271.4
42.8	109	228.2	56.7	134	273.2
43.3	110	230.0	57.2	135	275.0
43.9	111	231.8	57.8	136	276.8
44.4	112	233.6	58.3	137	278.6
45.0	113	235.4	58.9	138	280.4
45.6	114	237.2	59.4	139	282.2
46.1	115	239.0	60.0	140	284.0
46.7	116	240.8	60.6	141	285.8
47.2	117	242.6	61.1	142	287.6
47.8	118	244.4	61.7	143	289.4
48.3	119	246.2	62.2	144	291.2
48.9	120	248.0	62.8	145	293.0
49.4	121	249.8	63.3	146	294.8
50.0	122	251.6	63.9	147	296.6
50.6	123	253.4	64.4	148	298.4
51.1	124	255.2	65.0	149	300.2
51.7	125	257.0	65.6	150	302.0

Temperature Equivalents

Absolute Zero = -273°C = -459.4°F					
Deg.C	°F or °C	Deg.F	Deg.C	°F or °C	Deg.F
66.1	151	303.8	80.0	176	348.8
66.7	152	305.6	80.6	177	350.6
67.2	153	307.4	81.1	178	352.4
67.8	154	309.2	81.7	179	354.2
68.3	155	311.0	82.2	180	356.0
68.9	156	312.8	82.8	181	357.8
69.4	157	314.6	83.3	182	359.6
70.0	158	316.4	83.9	183	361.4
70.6	159	318.2	84.4	184	363.2
71.1	160	320.0	85.0	185	365.0
71.7	161	321.8	85.6	186	366.8
72.2	162	323.6	86.1	187	368.6
72.8	163	325.4	86.7	188	370.4
73.3	164	327.2	87.2	189	372.2
73.9	165	329.0	87.8	190	374.0
74.4	166	330.8	88.3	191	375.8
75.0	167	332.6	88.9	192	377.6
75.6	168	334.4	89.4	193	379.4
76.1	169	336.2	90.0	194	381.2
76.7	170	338.0	90.6	195	383.0
77.2	171	339.8	91.1	196	384.8
77.8	172	341.6	91.7	197	386.6
78.3	173	343.4	92.2	198	388.4
78.9	174	345.2	92.8	199	390.2
79.4	175	347.0	93.3	200	392.0

Absolute Zero = -273°C = -459.4°F

Deg. C	°F or °C	Deg. F	Deg. C	°F or °C	Deg. F
93.9	201	393.8	121.1	250	482.0
94.4	202	395.6	123.9	255	491.0
95.0	203	397.4	126.7	260	500.0
95.6	204	399.2	129.4	265	509.0
96.1	205	401.0	132.2	270	518.0
96.7	206	402.8	135.0	275	527.0
97.2	207	404.6	137.8	280	536.0
97.8	208	406.4	140.6	285	545.0
98.3	209	408.2	143.3	290	554.0
98.9	210	410.0	146.1	295	563.0
99.4	211	411.8	148.9	300	572.0
100.0	212	413.6	154.4	310	590.0
100.6	213	415.4	160.0	320	608.0
101.1	214	417.2	165.6	330	626.0
101.7	215	419.0	171.1	340	644.0
102.2	216	420.8	176.7	350	662.0
102.8	217	422.6	182.2	360	680.0
103.3	218	424.4	187.8	370	698.0
103.9	219	426.2	193.3	380	716.0
104.4	220	428.0	198.9	390	734.0
107.2	225	437.0	204.4	400	752.0
110.0	230	446.0	210.0	410	770.0
112.8	235	455.0	215.6	420	788.0
115.6	240	464.0	221.1	430	806.0
118.3	245	473.0	226.7	440	824.0

Absolute Zero = -273°C = -459.4°F					
Deg. C	°F or °C	Deg. F	Deg. C	°F or °C	Deg. F
232.2	450	842	371.1	700	1292
237.8	460	860	376.7	710	1310
243.3	470	878	382.2	720	1328
248.9	480	896	387.8	730	1346
254.4	490	914	393.3	740	1364
260.0	500	932	398.9	750	1382
265.6	510	950	404.4	760	1400
271.1	520	968	410.0	770	1418
276.7	530	986	415.6	780	1436
282.2	540	1004	421.1	790	1454
287.8	550	1022	426.7	800	1472
293.3	560	1040	432.2	810	1490
298.9	570	1058	437.8	820	1508
304.4	580	1076	443.3	830	1526
310.0	590	1094	448.9	840	1544
315.6	600	1112	454.4	850	1562
321.1	610	1130	460.0	860	5180
326.7	620	1148	465.6	870	5198
332.2	630	1166	471.1	880	1616
337.8	640	1184	476.7	890	1634
343.3	650	1202	482.2	900	1652
348.9	660	1220	487.8	910	1670
354.4	670	1238	493.3	920	1688
360.0	680	1256	498.9	930	1706
365.6	690	1274	504.4	940	1724

Absolute Zero = -273°C = -459.4°F					
Deg. C	°F or °C	Deg. F	Deg. C	°F or °C	Deg. F
510.0	950	1742	760.0	1400	2552
515.6	960	1760	771.1	1420	2588
521.1	970	1778	782.2	1440	2624
526.7	980	1796	793.3	1460	2660
532.2	990	1814	804.4	1480	2696
537.8	1000	1832	815.6	1500	2732
548.9	1020	1868	826.7	1520	2768
560.0	1040	1904	837.8	1540	2804
571.1	1060	1940	848.9	1560	2840
582.2	1080	1976	860.0	1580	2876
593.3	1100	2012	871.1	1600	2912
604.4	1120	2048	882.2	1620	2948
615.6	1140	2084	893.3	1640	2984
626.7	1160	2120	904.4	1660	3020
637.8	1180	2156	915.6	1680	3056
648.9	1200	2192	926.7	1700	3092
660.0	1220	2228	937.8	1720	3128
671.1	1240	2264	948.9	1740	3164
682.2	1260	2300	960.0	1760	3200
693.3	1280	2336	971.1	1780	3236
704.4	1300	2372	982.2	1800	3272
715.6	1320	2408	993.3	1820	3308
726.7	1340	2444	1004.4	1840	3344
737.8	1360	2480	1015.6	1860	3380
748.9	1380	2516	1026.7	1880	3416

Absolute Zero = -273°C = -459.4°F

Deg.C	°F or °C	Deg.F	Deg.C	°F or °C	Deg.F
1037.8	1900	3452	1315.6	2400	4352
1048.9	1920	3488	1326.7	2420	4388
1060.0	1940	3524	1337.8	2440	4424
1071.1	1960	3560	1348.9	2460	4460
1082.2	1980	3596	1360.0	2480	4496
1093.3	2000	3632	1371.1	2500	4532
1104.4	2020	3668	1382.2	2520	4568
1115.6	2040	3704	1393.3	2540	4604
1126.7	2060	3740	1404.4	2560	4640
1137.8	2080	3776	1415.6	2580	4676
1148.9	2100	3812	1426.7	2600	4712
1160.0	2120	3848	1437.8	2620	4748
1171.1	2140	3884	1448.9	2640	4784
1182.2	2160	3920	1460.0	2660	4820
1193.3	2180	3956	1471.1	2680	4856
1204.4	2200	3992	1482.2	2700	4892
1215.6	2220	4028	1493.3	2720	4928
1226.7	2240	4064	1504.4	2740	4964
1237.8	2260	4100	1515.6	2760	5000
1248.9	2280	4136	1526.7	2780	5036
1260.0	2300	4172	1537.8	2800	5072
1271.1	2320	4208	1565.6	2850	5162
1282.2	2340	4244	1593.3	2900	5252
1293.3	2360	4280	1621.1	2950	5342
1304.4	2380	4316	1648.9	3000	5432

U.S. GAL.		IMP. GAL.	U.S. GAL.		IMP. GAL.
1.20095	1	0.83267	31.225	26	21.649
2.402	2	1.665	32.426	27	22.482
3.603	3	2.498	33.627	28	23.315
4.804	4	3.331	34.828	29	24.147
6.005	5	4.163	36.029	30	24.980
7.206	6	4.996	37.229	31	25.813
8.407	7	5.829	38.430	32	26.645
9.608	8	6.661	39.631	33	27.478
10.809	9	7.494	40.832	34	28.311
12.010	10	8.327	42.033	35	29.143
13.210	11	9.159	43.234	36	29.976
14.411	12	9.992	44.435	37	30.809
15.612	13	10.825	45.636	38	31.641
16.813	14	11.657	46.837	39	32.474
18.014	15	12.490	48.038	40	33.307
19.215	16	13.323	49.239	41	34.139
20.416	17	14.155	50.440	42	34.972
21.617	18	14.988	51.641	43	35.805
22.818	19	15.821	52.842	44	36.637
24.019	20	16.653	54.043	45	37.470
25.220	21	17.486	55.244	46	38.303
26.421	22	18.319	56.445	47	39.135
27.622	23	19.151	57.646	48	39.968
28.823	24	19.984	58.847	49	40.801
30.024	25	20.817	60.047	50	41.634

Liquid Equivalents
Sheet 1 of 2

U.S. GAL.		IMP. GAL.	U.S. GAL.		IMP. GAL.
61.248	51	42.466	91.272	76	63.283
62.449	52	43.299	92.473	77	64.116
63.650	53	44.132	93.674	78	64.948
64.851	54	44.964	94.875	79	65.781
66.052	55	45.797	96.076	80	66.614
67.253	56	46.630	97.277	81	67.446
68.454	57	47.462	98.478	82	68.279
69.655	58	48.295	99.679	83	69.112
70.856	59	49.128	100.880	84	69.944
72.057	60	49.960	102.081	85	70.777
73.258	61	50.793	103.282	86	71.610
74.459	62	51.626	104.483	87	72.442
75.660	63	52.458	105.684	88	73.275
76.861	64	53.291	106.885	89	74.108
78.062	65	54.124	108.086	90	74.940
79.263	66	54.956	109.286	91	75.773
80.464	67	55.789	110.487	92	76.606
81.665	68	56.622	111.688	93	77.438
82.866	69	57.454	112.889	94	78.271
84.067	70	58.287	114.090	95	79.104
85.267	71	59.120	115.291	96	79.936
86.468	72	59.952	116.492	97	80.769
87.669	73	60.785	117.693	98	81.602
88.870	74	61.618	118.894	99	82.434
90.071	75	62.450	120.095	100	83.267

mm.	(Of One Inch)	inches
0.3969	1/64	0.015625
0.79375	1/32	0.03125
1.1906	3/64	0.046875
1.5875	1/16	0.0625
1.9844	5/64	0.078125
2.38125	3/32	0.09375
2.7781	7/64	0.109375
3.1750	1/8	0.125
3.5719	9/64	0.140625
3.96875	5/32	0.15625
4.3656	11/64	0.171875
4.7625	3/16	0.1875
5.1594	13/64	0.203125
5.55625	7/32	0.21875
5.9531	15/64	0.234375
6.3500	1/4	0.25
6.7469	17/64	0.265625
7.14375	9/32	0.28125
7.5406	19/64	0.296875
7.9375	5/16	0.3125
8.3344	21/64	0.328125
8.73125	11/32	0.34375
9.1281	23/64	0.359375
9.5250	3/8	0.375
9.9219	25/64	0.390625
10.31875	13/32	0.40625
10.7156	27/64	0.421875
11.1125	7/16	0.4375
11.5094	29/64	0.453125
11.90625	15/32	0.46875
12.3031	31/64	0.484375
12.7000	1/2	0.5

mm.	(Of One Inch)	inches
13.0969	33/64	0.515625
13.49375	17/32	0.53125
13.8906	35/64	0.546875
14.2875	9/16	0.5625
14.6844	37/64	0.578125
15.08125	19/32	0.59375
15.4781	39/64	0.609375
15.8750	5/8	0.625
16.2719	41/64	0.640625
16.66875	21/32	0.65625
17.0656	43/64	0.671875
17.4625	11/16	0.6875
17.8594	45/64	0.703125
18.25625	23/32	0.71875
18.6531	47/64	0.734375
19.0500	3/4	0.75
19.4469	49/64	0.765625
19.84375	25/32	0.78125
20.2406	51/64	0.796875
20.6375	13/16	0.8125
21.0344	53/64	0.828125
21.43125	27/32	0.84375
21.8281	55/64	0.859375
22.2250	7/8	0.875
22.6219	57/64	0.890625
23.01875	29/32	0.90625
23.4156	59/64	0.921875
23.8125	15/16	0.9375
24.2094	61/64	0.953125
24.60625	31/32	0.96875
25.0031	63/64	0.984375
25.4000	1	1.0

NUMBERED DRILLS												LETTERED DRILLS			
Drill No.	Diam. In.	Drill No.	Diam. In.	Drill No.	Diam. In.	Drill No.	Diam. In.	Drill No.	Diam. In.	Drill No.	Diam. In.	Drill No.	Diam. In.	Drill No.	Diam. In.
1	.2280	15	.1800	29	.1360	42	.0935	55	.0520	68	.0310	A	.234	N	.302
2	.2210	16	.1770	30	.1285	43	.0890	56	.0465	69	.0292	B	.238	O	.316
3	.2130	17	.1730	31	.1200	44	.0860	57	.0430	70	.0280	C	.242	P	.323
4	.2090	18	.1695	32	.1160	45	.0820	58	.0420	71	.0260	D	.246	Q	.332
5	.2055	19	.1660	33	.1130	46	.0810	59	.0410	72	.0250	E	.250	R	.339
6	.2040	20	.1610	34	.1110	47	.0785	60	.0400	73	.0240	F	.257	S	.348
7	.2010	21	.1590	35	.1100	48	.0760	61	.0390	74	.0225	G	.261	T	.358
8	.1990	22	.1570	36	.1065	49	.0730	62	.0380	75	.0210	H	.266	U	.368
9	.1960	23	.1540	37	.1040	50	.0700	63	.0370	76	.0200	I	.272	V	.377
10	.1935	24	.1520	38	.1015	51	.0670	64	.0360	77	.0180	J	.277	W	.386
11	.1910	25	.1495	39	.0995	52	.0635	65	.0350	78	.0160	K	.281	X	.397
12	.1890	26	.1470	40	.0980	53	.0595	66	.0330	79	.0145	L	.290	Y	.404
13	.1850	27	.1440	41	.0960	54	.0550	67	.0320	80	.0135	M	.295	Z	.413
14	.1820	28	.1405												

LITHO IN CANADA

C-L

CANADAIR LIMITED